



Newtonian Flow Formulas

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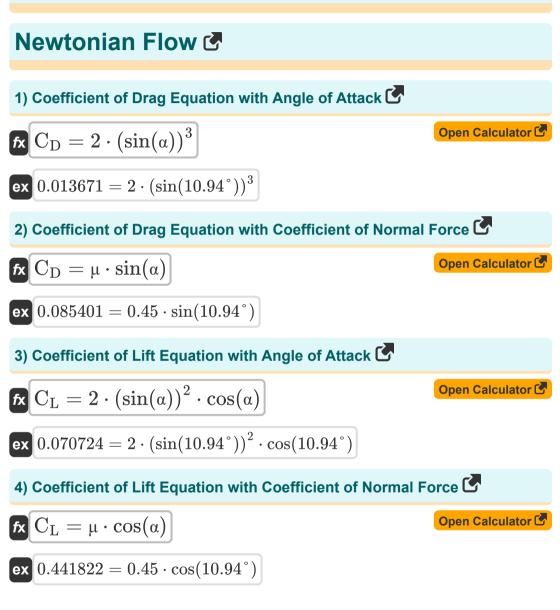
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List of 14 Newtonian Flow Formulas



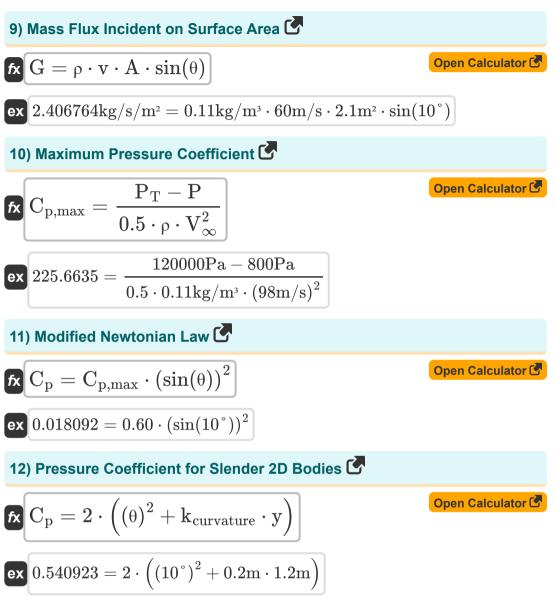


5) Drag Force with Angle of Attack 🕑

$$\begin{aligned} & \mathbf{F}_{D} = \frac{\mathbf{F}_{L}}{\cot(\alpha)} & \text{Open Calculator } \\ & \mathbf{F}_{D} = \frac{\mathbf{F}_{L}}{\cot(\alpha)} & \text{Open Calculator } \\ & \mathbf{F}_{D} = \frac{400.5N}{\cot(10.94^{\circ})} & \text{open Calculator } \\ & \mathbf{F}_{D} = \frac{2}{\cot(10.94^{\circ})} & \text{Open Calculator } \\ & \mathbf{F}_{D} = \frac{2}{\mathbf{Y} \cdot \mathbf{M}^{2}} \cdot \left(\frac{\mathbf{P}_{T}}{\mathbf{P}} - 1\right) & \text{Open Calculator } \\ & \mathbf{F}_{D} = \frac{2}{1.6 \cdot (8)^{2}} \cdot \left(\frac{120000Pa}{800Pa} - 1\right) & \text{Open Calculator } \\ & \mathbf{F}_{D} = \mathbf{A} \cdot \left(\mathbf{p} - \mathbf{p}_{static}\right) & \text{Open Calculator } \\ & \mathbf{F}_{D} = \mathbf{A} \cdot \left(\mathbf{p} - \mathbf{p}_{static}\right) & \text{Open Calculator } \\ & \mathbf{F}_{L} = \mathbf{F}_{D} \cdot \cot(\alpha) & \text{Open Calculator } \\ & \mathbf{F}_{L} = \mathbf{F}_{D} \cdot \cot(\alpha) & \text{Open Calculator } \\ & \mathbf{F}_{L} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \text{Open Calculator } \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \cot(10.94^{\circ}) & \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D} \cdot \mathbf{F}_{D} \\ & \mathbf{F}_{D} = \mathbf{F}_{D}$$









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13) Pressure Coefficient for Slender Bodies of Revolution

$$fx C_p = 2 \cdot (\theta)^2 + k_{curvature} \cdot y$$

$$ex \ 0.300923 = 2 \cdot (10^\circ)^2 + 0.2m \cdot 1.2m$$

$$fx F = \rho_{Fluid} \cdot u_{Fluid}^2 \cdot A \cdot (\sin(\theta))^2$$

$$fx F = \rho_{Fluid} \cdot u_{Fluid}^2 \cdot A \cdot (\sin(\theta))^2$$

$$ex \ 1.353524N = 9.5 \text{kg/m}^3 \cdot (1.5m/s)^2 \cdot 2.1m^2 \cdot (\sin(10^\circ))^2$$



Variables Used

- A Area (Square Meter)
- C_D Drag Coefficient
- CL Lift Coefficient
- C_p Pressure Coefficient
- Cp,max Maximum Pressure Coefficient
- **F** Force (Newton)
- **F**_D Drag Force (Newton)
- **F**_L Lift Force (Newton)
- G Mass Flux(g) (Kilogram per Second per Square Meter)
- kcurvature Curvature of Surface (Meter)
- M Mach Number
- p Surface Pressure (Pascal)
- P Pressure (Pascal)
- **p**static Static Pressure (Pascal)
- **P**_T Total Pressure (Pascal)
- UFluid Fluid Velocity (Meter per Second)
- **v** Velocity (Meter per Second)
- V_{∞} Freestream Velocity (Meter per Second)
- y Distance of Point from Centroidal Axis (Meter)
- Y Specific Heat Ratio
- α Angle of Attack (Degree)
- **θ** Angle of Inclination (Degree)



- µ Coefficient of Force
- **ρ** Density of Material (Kilogram per Cubic Meter)
- **P**Fluid Density of Fluid (Kilogram per Cubic Meter)





Constants, Functions, Measurements used

- Function: **cos**, cos(Angle) Cosine of an angle is the ratio of the side adjacent to the angle to the hypotenuse of the triangle.
- Function: cot, cot(Angle) Cotangent is a trigonometric function that is defined as the ratio of the adjacent side to the opposite side in a right triangle.
- Function: sin, sin(Angle) Sine is a trigonometric function that describes the ratio of the length of the opposite side of a right triangle to the length of the hypotenuse.
- Measurement: Length in Meter (m) Length Unit Conversion
- Measurement: Area in Square Meter (m²) Area Unit Conversion
- Measurement: Pressure in Pascal (Pa) Pressure Unit Conversion
- Measurement: Speed in Meter per Second (m/s) Speed Unit Conversion
- Measurement: Force in Newton (N) Force Unit Conversion
- Measurement: Angle in Degree (°) Angle Unit Conversion
- Measurement: Mass Flux in Kilogram per Second per Square Meter (kg/s/m²)

Mass Flux Unit Conversion

• Measurement: **Density** in Kilogram per Cubic Meter (kg/m³) Density Unit Conversion



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