calculatoratoz.com

unitsconverters.com

Fundamentals of Fluid Flow Formulas

Calculators! Examples! Conversions!

List of 71 Fundamentals of Fluid Flow Formulas

Fundamentals of Fluid Flow

Circulation and Vorticity

1) Area of Curve using Vorticity

Open Calculator

fx $$A = \frac{\Gamma}{\Omega}$$

ex $$50\mathrm{m^2} = \frac{350\mathrm{m^2/s}}{7/\mathrm{s}}$$

2) Circulation using Vorticity

Open Calculator

fx $$\Gamma = \Omega \cdot A$$

ex $$350\mathrm{m^2/s} = 7/\mathrm{s} \cdot 50\mathrm{m^2}$$

3) Vorticity of Fluid Flows

Open Calculator

fx $$\Omega = \frac{\Gamma}{A}$$

ex $$7/\mathrm{s} = \frac{350\mathrm{m^2/s}}{50\mathrm{m^2}}$$

Continuity Equation

4) Cross Sectional Area at Section 1 for Steady Flow

Open Calculator

$$A_{cs} = \frac{Q}{\rho_1 \cdot V_{Negativesurges}}$$

$$16.83333\text{m}^2 = \frac{1.01\text{m}^3/\text{s}}{0.02\text{kg}/\text{m}^3 \cdot 3\text{m}/\text{s}}$$

5) Cross Sectional Area at Section 2 given Flow at Section 1 for Steady Flow

Open Calculator

$$A_{cs} = \frac{Q}{\rho_2 \cdot V_2}$$

$$9.619048\text{m}^2 = \frac{1.01\text{m}^3/\text{s}}{0.021\text{kg}/\text{m}^3 \cdot 5\text{m}/\text{s}}$$

6) Cross Sectional Area at Section given Discharge for Steady Incompressible Fluid

Open Calculator

$$A_{cs} = \frac{Q}{u_{Fluid}}$$

$$12.625\text{m}^2 = \frac{1.01\text{m}^3/\text{s}}{0.08\text{m}/\text{s}}$$

7) Discharge through Section for Steady Incompressible Fluid

Open Calculator

fx $$Q = A_{cs} \cdot u_{Fluid}$$

ex $$1.04\text{m}^3/\text{s} = 13\text{m}^2 \cdot 0.08\text{m/s}$$

8) Mass Density at Section 1 for Steady Flow

Open Calculator

fx $$\rho_1 = \frac{Q}{A_{cs} \cdot V_{Negativesurges}}$$

ex $$0.025897\text{kg/m}^3 = \frac{1.01\text{m}^3/\text{s}}{13\text{m}^2 \cdot 3\text{m/s}}$$

9) Mass Density at Section 2 given Flow at Section 1 for Steady Flow

Open Calculator

fx $$\rho_2 = \frac{Q}{A_{cs} \cdot V_2}$$

ex $$0.015538\text{kg/m}^3 = \frac{1.01\text{m}^3/\text{s}}{13\text{m}^2 \cdot 5\text{m/s}}$$

10) Velocity at Section 1 for Steady Flow

Open Calculator

fx $$u_{01} = \frac{Q}{A_{cs} \cdot \rho_1}$$

ex $$3.884615\text{m/s} = \frac{1.01\text{m}^3/\text{s}}{13\text{m}^2 \cdot 0.02\text{kg/m}^3}$$

11) Velocity at Section 2 given Flow at Section 1 for Steady Flow

Open Calculator

fx $$u_{02} = \frac{Q}{A_{cs} \cdot \rho_2}$$

ex $$3.699634\text{m/s} = \frac{1.01\text{m}^3/\text{s}}{13\text{m}^2 \cdot 0.021\text{kg/m}^3}$$

12) Velocity at Section for Discharge through Section for Steady Incompressible Fluid

Open Calculator

fx $$u_{Fluid} = \frac{Q}{A_{cs}}$$

ex $$0.077692\text{m/s} = \frac{1.01\text{m}^3/\text{s}}{13\text{m}^2}$$

Description of the Flow Pattern

13) Component of Velocity in X Direction using Slope of Streamline

Open Calculator

fx $$u = \frac{v}{\tan\left(\frac{\pi}{180} \cdot \theta\right)}$$

ex $$8.011511\text{m/s} = \frac{10\text{m/s}}{\tan\left(\frac{\pi}{180} \cdot 51.3\right)}$$

14) Component of Velocity in Y Direction given Slope of Streamline

Open Calculator

fx $$v = u \cdot \tan\left(\frac{\pi}{180} \cdot \theta\right)$$

ex $$9.985632\text{m/s} = 8\text{m/s} \cdot \tan\left(\frac{\pi}{180} \cdot 51.3\right)$$

15) Slope of Streamline

Open Calculator

fx $$\theta = \arctan\left(\frac{v}{u}\right) \cdot \left(\frac{180}{\pi}\right)$$

ex $$51.34019 = \arctan\left(\frac{10\text{m/s}}{8\text{m/s}}\right) \cdot \left(\frac{180}{\pi}\right)$$

Streamlines, Equipotential Lines and Flow Net

16) Component of Velocity in X Direction given Slope of Equipotential Line

Open Calculator

fx $$u = v \cdot \Phi$$

ex $$8\text{m/s} = 10\text{m/s} \cdot 0.8$$

17) Component of Velocity in X Direction using Slope of Streamline

Open Calculator

fx $$u = \frac{v}{\tan\left(\frac{\pi}{180} \cdot \theta\right)}$$

ex $$8.011511\text{m/s} = \frac{10\text{m/s}}{\tan\left(\frac{\pi}{180} \cdot 51.3\right)}$$

18) Component of Velocity in Y Direction given Slope of Equipotential Line

fx $$v = \frac{u}{\Phi}$$

Open Calculator

ex $$10\text{m/s} = \frac{8\text{m/s}}{0.8}$$

19) Component of Velocity in Y Direction given Slope of Streamline

fx $$v = u \cdot \tan\left(\frac{\pi}{180} \cdot \theta\right)$$

Open Calculator

ex $$9.985632\text{m/s} = 8\text{m/s} \cdot \tan\left(\frac{\pi}{180} \cdot 51.3\right)$$

20) Slope of Equipotential Line

fx $$\Phi = \frac{u}{v}$$

Open Calculator

ex $$0.8 = \frac{8\text{m/s}}{10\text{m/s}}$$

21) Slope of Streamline

fx $$\theta = \arctan\left(\frac{v}{u}\right) \cdot \left(\frac{180}{\pi}\right)$$

Open Calculator

ex $$51.34019 = \arctan\left(\frac{10\text{m/s}}{8\text{m/s}}\right) \cdot \left(\frac{180}{\pi}\right)$$

Torque Exerted on a Wheel with Radial Curved Vanes

22) Angular Momentum at Inlet

Open Calculator

$$L = \left(\frac{w_f \cdot v_f}{G}\right) \cdot r$$

ex $$148.32\text{kg*m}^2/\text{s} = \left(\frac{12.36\text{N} \cdot 40\text{m/s}}{10}\right) \cdot 3\text{m}$$

23) Angular Momentum at Outlet

Open Calculator

$$L = \left(\frac{w_f \cdot v}{G}\right) \cdot r$$

ex $$35.93052\text{kg*m}^2/\text{s} = \left(\frac{12.36\text{N} \cdot 9.69\text{m/s}}{10}\right) \cdot 3\text{m}$$

24) Angular Velocity for Work Done on Wheel per Second

Open Calculator

$$\omega = \frac{w \cdot G}{w_f \cdot (v_f \cdot r + v \cdot r_O)}$$

ex $$13.35424\text{rad/s} = \frac{3.9\text{KJ} \cdot 10}{12.36\text{N} \cdot (40\text{m/s} \cdot 3\text{m} + 9.69\text{m/s} \cdot 12\text{m})}$$

25) Efficiency of System

Open Calculator

$$\eta = \left(1 - \left(\frac{v}{v_f}\right)^2\right)$$

$$0.941315 = \left(1 - \left(\frac{9.69\text{m/s}}{40\text{m/s}}\right)^2\right)$$

26) Initial Velocity for Work Done if Jet leaves in Motion of Wheel

Open Calculator

$$u = \frac{\left(\frac{P_{dc} \cdot G}{w_f}\right) + (v \cdot v_f)}{v_f}$$

$$54.37042\text{m/s} = \frac{\left(\frac{2209\text{W} \cdot 10}{12.36\text{N}}\right) + (9.69\text{m/s} \cdot 40\text{m/s})}{40\text{m/s}}$$

27) Initial Velocity given Power Delivered to Wheel

Open Calculator

$$u = \left(\left(\frac{P_{dc} \cdot G}{w_f \cdot v_f}\right) - (v)\right)$$

$$34.99042\text{m/s} = \left(\left(\frac{2209\text{W} \cdot 10}{12.36\text{N} \cdot 40\text{m/s}}\right) - (9.69\text{m/s})\right)$$

28) Initial Velocity when Work Done at Vane Angle is 90 and Velocity is Zero

Open Calculator

$$u = \frac{w \cdot G}{w_f \cdot v_f}$$

$$78.8835\mathrm{m/s} = \frac{3.9\mathrm{KJ} \cdot 10}{12.36\mathrm{N} \cdot 40\mathrm{m/s}}$$

29) Mass of Fluid Striking Vane per Second

Open Calculator

$$m_f = \frac{w_f}{G}$$

$$1.236\mathrm{kg} = \frac{12.36\mathrm{N}}{10}$$

30) Power Delivered to Wheel

Open Calculator

$$P_{dc} = \left(\frac{w_f}{G}\right) \cdot (v_f \cdot u + v \cdot v_f)$$

$$2209.474\mathrm{W} = \left(\frac{12.36\mathrm{N}}{10}\right) \cdot (40\mathrm{m/s} \cdot 35\mathrm{m/s} + 9.69\mathrm{m/s} \cdot 40\mathrm{m/s})$$

31) Radius at Inlet for Work Done on Wheel per Second

Open Calculator

$$r = \frac{\left(\frac{w \cdot G}{w_f \cdot \omega}\right) - (v \cdot r_O)}{v_f}$$

$$3.160961\text{m} = \frac{\left(\frac{3.9\text{KJ} \cdot 10}{12.36\text{N} \cdot 13\text{rad/s}}\right) - (9.69\text{m/s} \cdot 12\text{m})}{40\text{m/s}}$$

32) Radius at Inlet with Known Torque by Fluid

Open Calculator

$$r = \frac{\left(\frac{\tau \cdot G}{w_f}\right) + (v \cdot r_O)}{v_f}$$

$$8.813149\text{m} = \frac{\left(\frac{292\text{N*m} \cdot 10}{12.36\text{N}}\right) + (9.69\text{m/s} \cdot 12\text{m})}{40\text{m/s}}$$

33) Radius at Outlet for Torque Exerted by Fluid

Open Calculator

$$r_O = \frac{\left(\frac{\tau \cdot G}{w_f}\right) - (v_f \cdot r)}{v}$$

$$11.99649\text{m} = \frac{\left(\frac{292\text{N*m} \cdot 10}{12.36\text{N}}\right) - (40\text{m/s} \cdot 3\text{m})}{9.69\text{m/s}}$$

34) Radius at Outlet for Work Done on Wheel per Second

Open Calculator

fx $$r_O = \frac{\left(\frac{w \cdot G}{w_f \cdot \omega}\right) - (v_f \cdot r)}{v}$$

ex $$12.66444\text{m} = \frac{\left(\frac{3.9\text{KJ} \cdot 10}{12.36\text{N} \cdot 13\text{rad/s}}\right) - (40\text{m/s} \cdot 3\text{m})}{9.69\text{m/s}}$$

35) Speed of Wheel given Tangential Velocity at Inlet Tip of Vane

Open Calculator

fx $$\Omega = \frac{v_{tangential} \cdot 60}{2 \cdot \pi \cdot r}$$

ex $$3.183099\text{rev/s} = \frac{60\text{m/s} \cdot 60}{2 \cdot \pi \cdot 3\text{m}}$$

36) Speed of Wheel given Tangential Velocity at Outlet Tip of Vane

Open Calculator

fx $$\Omega = \frac{v_{tangential} \cdot 60}{2 \cdot \pi \cdot r_O}$$

ex $$0.795775\text{rev/s} = \frac{60\text{m/s} \cdot 60}{2 \cdot \pi \cdot 12\text{m}}$$

37) Torque Exerted by Fluid

Open Calculator

fx $$\tau = \left(\frac{w_f}{G}\right) \cdot (v_f \cdot r + v \cdot r_O)$$

ex $$292.0421\text{N*m} = \left(\frac{12.36\text{N}}{10}\right) \cdot (40\text{m/s} \cdot 3\text{m} + 9.69\text{m/s} \cdot 12\text{m})$$

38) Velocity at Point given Efficiency of System

Open Calculator

$$v = \sqrt{1 - \eta} \cdot v_f$$

ex $$17.88854\text{m/s} = \sqrt{1 - 0.80} \cdot 40\text{m/s}$$

39) Velocity for Work Done if there is no Loss of Energy

Open Calculator

$$v_f = \sqrt{\left(\frac{w \cdot 2 \cdot G}{w_f}\right) + v^2}$$

ex $$80.02859\text{m/s} = \sqrt{\left(\frac{3.9\text{KJ} \cdot 2 \cdot 10}{12.36\text{N}}\right) + (9.69\text{m/s})^2}$$

40) Velocity given Angular Momentum at Inlet

Open Calculator

$$v_f = \frac{L \cdot G}{w_f \cdot r}$$

ex $$67.42179\text{m/s} = \frac{250\text{kg*m}^2\text{/s} \cdot 10}{12.36\text{N} \cdot 3\text{m}}$$

41) Velocity given Angular Momentum at Outlet

Open Calculator

$$v = \frac{T_m \cdot G}{w_f \cdot r}$$

ex $$10.38296\text{m/s} = \frac{38.5\text{kg*m/s} \cdot 10}{12.36\text{N} \cdot 3\text{m}}$$

42) Velocity given Efficiency of System

Open Calculator

$$v_f = \frac{V}{\sqrt{1-\eta}}$$

$$21.6675\text{m/s} = \frac{9.69\text{m/s}}{\sqrt{1-0.80}}$$

Radius of the Wheel

43) Radius of Wheel for Tangential Velocity at Inlet Tip of Vane

Open Calculator

$$r = \frac{v}{\frac{2\cdot\pi\cdot\Omega}{60}}$$

$$7.012873\text{m} = \frac{9.69\text{m/s}}{\frac{2\cdot\pi\cdot 2.1\text{rev/s}}{60}}$$

44) Radius of Wheel for Tangential Velocity at Outlet Tip of Vane

Open Calculator

$$r = \frac{v_{tangential}}{\frac{2\cdot\pi\cdot\Omega}{60}}$$

$$4.547284\text{m} = \frac{60\text{m/s}}{\frac{2\cdot\pi\cdot 2.1\text{rev/s}}{60}}$$

45) Radius of Wheel given Angular Momentum at Inlet

Open Calculator

fx $$r = \frac{L}{\frac{w_f \cdot v_f}{G}}$$

ex $$5.056634\text{m} = \frac{250\text{kg*m}^2/\text{s}}{\frac{12.36\text{N} \cdot 40\text{m/s}}{10}}$$

Tangential momentum and Tangential velocity

46) Tangential Momentum of Fluid Striking Vanes at Inlet

Open Calculator

fx $$T_m = \frac{w_f \cdot v_f}{G}$$

ex $$49.44\text{kg*m/s} = \frac{12.36\text{N} \cdot 40\text{m/s}}{10}$$

47) Tangential Momentum of Fluid Striking Vanes at Outlet

Open Calculator

fx $$T_m = \frac{w_f \cdot v}{G}$$

ex $$11.97684\text{kg*m/s} = \frac{12.36\text{N} \cdot 9.69\text{m/s}}{10}$$

48) Tangential Velocity at Inlet Tip of Vane

Open Calculator

fx $$v_{tangential} = \left(\frac{2 \cdot \pi \cdot \Omega}{60}\right) \cdot r$$

ex $$39.58407\text{m/s} = \left(\frac{2 \cdot \pi \cdot 2.1\text{rev/s}}{60}\right) \cdot 3\text{m}$$

49) Tangential Velocity at Outlet Tip of Vane

Open Calculator

fx $$v_{tangential} = \left(\frac{2 \cdot \pi \cdot \Omega}{60}\right) \cdot r$$

ex $$39.58407\text{m/s} = \left(\frac{2 \cdot \pi \cdot 2.1\text{rev/s}}{60}\right) \cdot 3\text{m}$$

50) Velocity given Tangential Momentum of Fluid Striking Vanes at Inlet

Open Calculator

fx $$u = \frac{T_m \cdot G}{w_f}$$

ex $$31.14887\text{m/s} = \frac{38.5\text{kg*m/s} \cdot 10}{12.36\text{N}}$$

51) Velocity given Tangential Momentum of Fluid Striking Vanes at Outlet

Open Calculator

$$u = \frac{T_m \cdot G}{w_f}$$

ex $$31.14887\text{m/s} = \frac{38.5\text{kg*m/s} \cdot 10}{12.36\text{N}}$$

Velocity at Inlet

52) Velocity at Inlet given Torque by Fluid

Open Calculator

$$v_f = \frac{\left(\frac{\tau \cdot G}{w_f}\right) + (v \cdot r)}{r_O}$$

ex $$22.10966\text{m/s} = \frac{\left(\frac{292\text{N*m} \cdot 10}{12.36\text{N}}\right) + (9.69\text{m/s} \cdot 3\text{m})}{12\text{m}}$$

53) Velocity at Inlet given Work Done on Wheel

Open Calculator

$$v_f = \frac{\left(\frac{w \cdot G}{w_f \cdot \omega}\right) - v \cdot r_O}{r}$$

ex $$42.14615\text{m/s} = \frac{\left(\frac{3.9\text{KJ} \cdot 10}{12.36\text{N} \cdot 13\text{rad/s}}\right) - 9.69\text{m/s} \cdot 12\text{m}}{3\text{m}}$$

54) Velocity at Inlet when Work Done at Vane Angle is 90 and Velocity is Zero

Open Calculator

$$v_f = \frac{w \cdot G}{w_f \cdot u}$$

$$90.15257\text{m/s} = \frac{3.9\text{KJ} \cdot 10}{12.36\text{N} \cdot 35\text{m/s}}$$

Velocity at Outlet

55) Velocity at Outlet given Power Delivered to Wheel

Open Calculator

$$v = \frac{\left(\frac{P_{dc} \cdot G}{w_f}\right) - (v_f \cdot u)}{v_f}$$

$$9.680421\text{m/s} = \frac{\left(\frac{2209\text{W} \cdot 10}{12.36\text{N}}\right) - (40\text{m/s} \cdot 35\text{m/s})}{40\text{m/s}}$$

56) Velocity at Outlet given Torque by Fluid

Open Calculator

$$v = \frac{\left(\frac{\tau \cdot G}{w_f}\right) - (v_f \cdot r)}{r_O}$$

$$9.687163\text{m/s} = \frac{\left(\frac{292\text{N*m} \cdot 10}{12.36\text{N}}\right) - (40\text{m/s} \cdot 3\text{m})}{12\text{m}}$$

57) Velocity at Outlet given Work Done if Jet leaves in Motion of Wheel

Open Calculator

$$v = \frac{\left(\frac{w \cdot G}{w_f}\right) - (v_f \cdot u)}{v_f}$$

$$43.8835\text{m/s} = \frac{\left(\frac{3.9\text{KJ} \cdot 10}{12.36\text{N}}\right) - (40\text{m/s} \cdot 35\text{m/s})}{40\text{m/s}}$$

58) Velocity at Outlet given Work Done on Wheel

Open Calculator

$$v = \frac{\left(\frac{w \cdot G}{w_f \cdot \omega}\right) - (v_f \cdot r)}{r_O}$$

$$10.22654\text{m/s} = \frac{\left(\frac{3.9\text{KJ} \cdot 10}{12.36\text{N} \cdot 13\text{rad/s}}\right) - (40\text{m/s} \cdot 3\text{m})}{12\text{m}}$$

Weight of the Fluid

59) Weight of Fluid for Work Done if there is no loss of Energy

Open Calculator

$$w_f = \frac{w \cdot 2 \cdot G}{v_f^2 - v^2}$$

$$51.78926\text{N} = \frac{3.9\text{KJ} \cdot 2 \cdot 10}{(40\text{m/s})^2 - (9.69\text{m/s})^2}$$

60) Weight of Fluid for Work Done on Wheel per Second

Open Calculator

$$w_f = \frac{w \cdot G}{(v_f \cdot r + v \cdot r_O) \cdot \omega}$$

$$12.6968N = \frac{3.9KJ \cdot 10}{(40m/s \cdot 3m + 9.69m/s \cdot 12m) \cdot 13rad/s}$$

61) Weight of Fluid given Angular Momentum at Inlet

Open Calculator

$$w_f = \frac{L \cdot G}{v_f \cdot r}$$

$$20.83333N = \frac{250kg^*m^2/s \cdot 10}{40m/s \cdot 3m}$$

62) Weight of Fluid given Angular Momentum at Outlet

Open Calculator

$$w_f = \frac{T_m \cdot G}{v \cdot r_O}$$

$$91.97884N = \frac{38.5kg^*m/s \cdot 10}{9.69m/s \cdot 12m}$$

63) Weight of Fluid given Mass of Fluid Striking Vane per Second

Open Calculator

$$w_f = m_f \cdot G$$

$$9N = 0.9kg \cdot 10$$

64) Weight of Fluid given Power Delivered to Wheel

Open Calculator

fx $$w_f = \frac{P_{dc} \cdot G}{v_f \cdot u + v \cdot v_f}$$

ex $$12.35735\text{N} = \frac{2209\text{W} \cdot 10}{40\text{m/s} \cdot 35\text{m/s} + 9.69\text{m/s} \cdot 40\text{m/s}}$$

65) Weight of Fluid given Tangential Momentum of Fluid Striking Vanes at Inlet

Open Calculator

fx $$w_f = \frac{T_m \cdot G}{v_f}$$

ex $$9.625\text{N} = \frac{38.5\text{kg*m/s} \cdot 10}{40\text{m/s}}$$

66) Weight of Fluid given Work Done if Jet leaves in Motion of Wheel

Open Calculator

fx $$w_f = \frac{w \cdot G}{v_f \cdot u - v \cdot v_f}$$

ex $$38.52232\text{N} = \frac{3.9\text{KJ} \cdot 10}{40\text{m/s} \cdot 35\text{m/s} - 9.69\text{m/s} \cdot 40\text{m/s}}$$

67) Weight of Fluid when Work Done at Vane Angle is 90 and Velocity is Zero

Open Calculator

$$w_f = \frac{w \cdot G}{v_f \cdot u}$$

$$27.85714\mathrm{N} = \frac{3.9\mathrm{KJ} \cdot 10}{40\mathrm{m/s} \cdot 35\mathrm{m/s}}$$

Work Done

68) Work Done for Radial Discharge at Vane Angle is 90 and Velocity is Zero

Open Calculator

$$w = \left(\frac{w_f}{G}\right) \cdot (v_f \cdot u)$$

$$1.7304\mathrm{KJ} = \left(\frac{12.36\mathrm{N}}{10}\right) \cdot (40\mathrm{m/s} \cdot 35\mathrm{m/s})$$

69) Work Done if Jet leaves in Direction as that of Motion of Wheel

Open Calculator

$$w = \left(\frac{w_f}{G}\right) \cdot (v_f \cdot u - v \cdot v_f)$$

$$1.251326\mathrm{KJ} = \left(\frac{12.36\mathrm{N}}{10}\right) \cdot (40\mathrm{m/s} \cdot 35\mathrm{m/s} - 9.69\mathrm{m/s} \cdot 40\mathrm{m/s})$$

70) Work Done if there is no Loss of Energy

Open Calculator

fx $$w = \left(\frac{w_f}{2} \cdot G\right) \cdot \left(v_f^2 - v^2\right)$$

ex $$0.093077\text{KJ} = \left(\frac{12.36\text{N}}{2} \cdot 10\right) \cdot \left((40\text{m/s})^2 - (9.69\text{m/s})^2\right)$$

71) Work Done on Wheel per Second

Open Calculator

fx $$w = \left(\frac{w_f}{G}\right) \cdot \left(v_f \cdot r + v \cdot r_O\right) \cdot \omega$$

ex $$3.796547\text{KJ} = \left(\frac{12.36\text{N}}{10}\right) \cdot (40\text{m/s} \cdot 3\text{m} + 9.69\text{m/s} \cdot 12\text{m}) \cdot 13\text{rad/s}$$

Variables Used

- **A** Area *(Square Meter)*
- **A_{cs}** Cross-Sectional Area *(Square Meter)*
- **G** Specific Gravity of Fluid
- **L** Angular Momentum *(Kilogram Square Meter per Second)*
- **m_f** Fluid Mass *(Kilogram)*
- **P_{dc}** Power Delivered *(Watt)*
- **Q** Discharge of Fluid *(Cubic Meter per Second)*
- **r** Radius of wheel *(Meter)*
- **r_O** Radius of Outlet *(Meter)*
- **T_m** Tangential Momentum *(Kilogram Meter per Second)*
- **u** Component of Velocity in X Direction *(Meter per Second)*
- **u** Initial Velocity *(Meter per Second)*
- **u_{01}** Initial Velocity at Point 1 *(Meter per Second)*
- **u_{02}** Initial Velocity at Point 2 *(Meter per Second)*
- **u_{Fluid}** Fluid Velocity *(Meter per Second)*
- **v** Component of Velocity in Y Direction *(Meter per Second)*
- **v** Velocity of Jet *(Meter per Second)*
- **V_2** Velocity of Fluid at 2 *(Meter per Second)*
- **v_f** Final Velocity *(Meter per Second)*
- **$V_{Negativesurges}$** Velocity of Fluid at Negative Surges *(Meter per Second)*
- **$v_{tangential}$** Tangential Velocity *(Meter per Second)*
- **w** Work Done *(Kilojoule)*

- w_f Weight of Fluid *(Newton)*
- Γ Circulation *(Square Meter per Second)*
- η Efficiency of Jet
- θ Slope of Streamline
- ρ_1 Density of Liquid 1 *(Kilogram per Cubic Meter)*
- ρ_2 Density of Liquid 2 *(Kilogram per Cubic Meter)*
- τ Torque Exerted on Wheel *(Newton Meter)*
- Φ Slope of Equipotential Line
- ω Angular Velocity *(Radian per Second)*
- Ω Vorticity *(1 per Second)*
- Ω Angular Speed *(Revolution per Second)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Function: **arctan**, arctan(Number)
  Inverse trigonometric tangent function
- Function: **ctan**, ctan(Angle)
  Trigonometric cotangent function
- Function: **sqrt**, sqrt(Number)
  Square root function
- Function: **tan**, tan(Angle)
  Trigonometric tangent function
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Weight** in Kilogram (kg)
  Weight Unit Conversion
- Measurement: **Area** in Square Meter (m^2)
  Area Unit Conversion
- Measurement: **Speed** in Meter per Second (m/s)
  Speed Unit Conversion
- Measurement: **Energy** in Kilojoule (KJ)
  Energy Unit Conversion
- Measurement: **Power** in Watt (W)
  Power Unit Conversion
- Measurement: **Force** in Newton (N)
  Force Unit Conversion
- Measurement: **Volumetric Flow Rate** in Cubic Meter per Second (m^3/s)
  Volumetric Flow Rate Unit Conversion

- Measurement: **Angular Velocity** in Radian per Second (rad/s), Revolution per Second (rev/s)
  Angular Velocity Unit Conversion
- Measurement: **Density** in Kilogram per Cubic Meter (kg/m³)
  Density Unit Conversion
- Measurement: **Torque** in Newton Meter (N*m)
  Torque Unit Conversion
- Measurement: **Angular Momentum** in Kilogram Square Meter per Second (kg*m²/s)
  Angular Momentum Unit Conversion
- Measurement: **Momentum** in Kilogram Meter per Second (kg*m/s)
  Momentum Unit Conversion
- Measurement: **Momentum Diffusivity** in Square Meter per Second (m²/s)
  Momentum Diffusivity Unit Conversion
- Measurement: **Vorticity** in 1 per Second (1/s)
  Vorticity Unit Conversion

Check other formula lists

- Buoyancy And Floatation Formulas
- Culverts Formulas
- Equations of Motion and Energy Equation Formulas
- Flow of Compressible Fluids Formulas
- Flow Over Notches and Weirs Formulas
- Fluid Pressure and Its Measurement Formulas
- Fundamentals of Fluid Flow Formulas
- Hydroelectric Power Generation Formulas
- Hydrostatic Forces on Surfaces Formulas
- Impact of Free Jets Formulas
- Impulse Momentum Equation and its Applications Formulas
- Liquids in Relative Equilibrium Formulas
- Most Efficient Section of Channel Formulas
- Non-uniform Flow in Channels Formulas
- Properties of Fluid Formulas
- Thermal Expansion of Pipe and Pipe Stresses Formulas
- Uniform Flow in Channels Formulas
- Water Power Engineering Formulas

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

2/5/2024 | 5:15:16 AM UTC *Please leave your feedback here...*