



# Devices to Measure Flow Rate Formulas

#### Calculators!

Examples!

Conversions!

Bookmark calculatoratoz.com, unitsconverters.com

Widest Coverage of Calculators and Growing - 30,000+ Calculators! Calculate With a Different Unit for Each Variable - In built Unit Conversion! Widest Collection of Measurements and Units - 250+ Measurements!

Feel free to SHARE this document with your friends!

Please leave your feedback here...

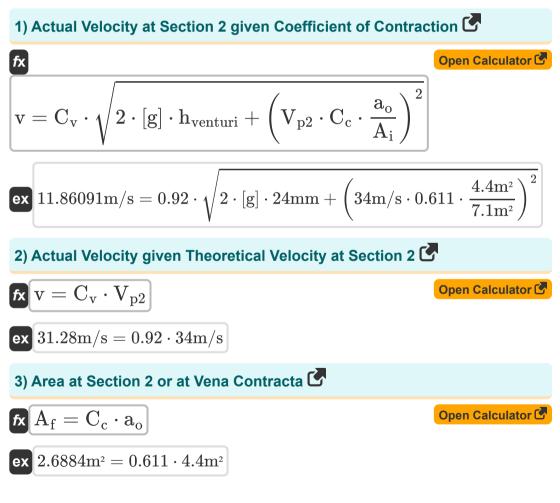




# List of 25 Devices to Measure Flow Rate Formulas

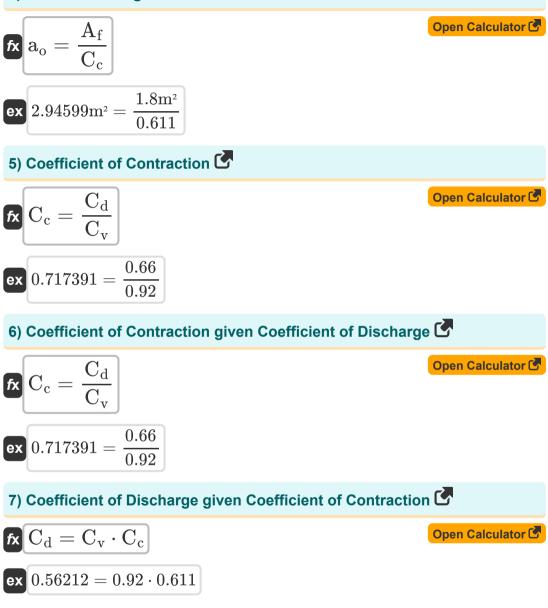
## Devices to Measure Flow Rate C

### Orifice Meter 🕑



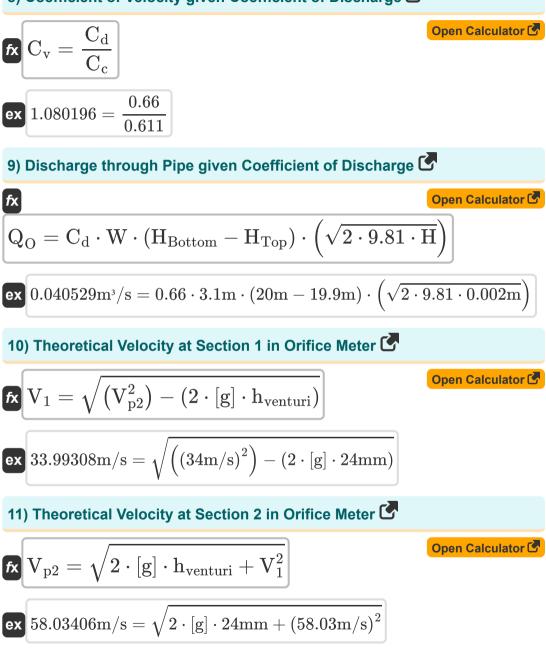


#### 4) Area of Orifice given Area at Section 2 or at Vena Contracta





8) Coefficient of Velocity given Coefficient of Discharge 🗹





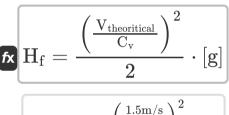
### Pitot Tube 🕑

#### 12) Actual Velocity of Flowing Stream 子

fx 
$$\mathbf{v} = \mathrm{C_v} \cdot \sqrt{2 \cdot [\mathrm{g}] \cdot \mathrm{H_f}}$$

ex 
$$14.17281 \mathrm{m/s} = 0.92 \cdot \sqrt{2 \cdot \mathrm{[g]} \cdot 12.10}$$

13) Height of Fluid raised in Tube given Actual Velocity of Flowing Stream



ex 
$$13.0346 = \frac{\left(\frac{1.031/3}{0.92}\right)}{2} \cdot [g]$$

Open Calculator

Open Calculator

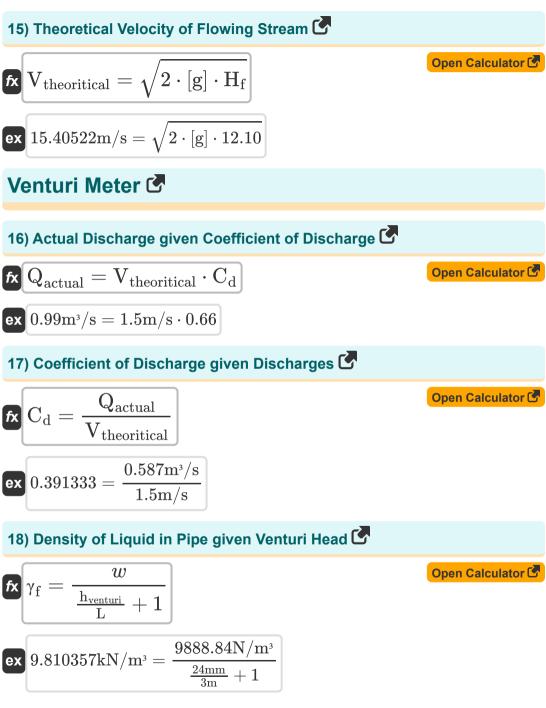
14) Height of Fluid raised in Tube given Theoretical Velocity of Flowing Stream

fx 
$$\mathbf{H}_{\mathrm{f}}=rac{\mathrm{V}_{\mathrm{theoritical}}^{2}\cdot[\mathrm{g}]}{2}$$
 ex  $11.03248=rac{(1.5\mathrm{m/s})^{2}}{2}\cdot[\mathrm{g}]$ 

Open Calculator







### 19) Density of Manometric Liquid given Venturi Head 子

fx 
$$w = \gamma_{\rm f} \cdot \left(rac{{
m h}_{
m venturi}}{{
m L}}+1
ight)$$
 Open Calculator C ex  $9888.48 {
m N/m^3}=9.81 {
m kN/m^3} \cdot \left(rac{24 {
m mm}}{3 {
m m}}+1
ight)$ 

### 20) Inlet Area given Theoretical Discharge 🕑

fx 
$$A_{i} = \sqrt{rac{\left( Q_{th} \cdot A_{f} 
ight)^{2}}{\left( Q_{th} 
ight)^{2} - \left( A_{f}^{2} \cdot 2 \cdot [g] \cdot h_{venturi} 
ight)}}$$

ex 
$$7.073493$$
m<sup>2</sup> =  $\sqrt{\frac{(1.277 \text{m}^3/\text{s} \cdot 1.8 \text{m}^2)^2}{(1.277 \text{m}^3/\text{s})^2 - ((1.8 \text{m}^2)^2 \cdot 2 \cdot [\text{g}] \cdot 24 \text{mm})}}$ 

### 21) Theoretical Discharge given Coefficient of Discharge 🕑

fx 
$$Q_{th} = rac{Q_{actual}}{C_d}$$
 ex  $0.889394 \mathrm{m^3/s} = rac{0.587 \mathrm{m^3/s}}{0.66}$ 



8/13

22) Theoretical Discharge through Pipe 🕑

$$\label{eq:Qth} \textbf{fx} \boxed{ Q_{th} = \frac{A_i \cdot A_f \cdot \left( \sqrt{2 \cdot [g] \cdot h_{venturi}} \right)}{\sqrt{(A_i)^2 - (A_f)^2}} } } \qquad \textbf{Open Calculator Calcu$$

ex 
$$1.276671 \text{m}^3/\text{s} = rac{7.1 \text{m}^2 \cdot 1.8 \text{m}^2 \cdot \left(\sqrt{2 \cdot [\text{g}] \cdot 24 \text{mm}}\right)}{\sqrt{\left(7.1 \text{m}^2\right)^2 - \left(1.8 \text{m}^2\right)^2}}$$

23) Throat Area given Theoretical Discharge 🚰

fx 
$$\mathrm{A_{f}} = \sqrt{rac{\left(\mathrm{A_{i}} \cdot \mathrm{Q_{th}}
ight)^{2}}{\left(\mathrm{A_{i}}^{2} \cdot 2 \cdot [\mathrm{g}] \cdot \mathrm{h_{venturi}}
ight) + \mathrm{Q_{th}}^{2}}}$$

ex 
$$1.800435 \text{m}^2 = \sqrt{\frac{(7.1 \text{m}^2 \cdot 1.277 \text{m}^3/\text{s})^2}{\left((7.1 \text{m}^2)^2 \cdot 2 \cdot [\text{g}] \cdot 24 \text{mm}\right) + (1.277 \text{m}^3/\text{s})^2}}$$

#### 24) Venturi Head given Difference in Levels of Manometric Liquid in Two Limbs 🖸

Open Calculator

fx 
$$h_{venturi} = L \cdot \left(\frac{w}{\gamma_f} - 1\right)$$
  
ex  $24.11009mm = 3m \cdot \left(\frac{9888.84N/m^3}{9.81kN/m^3} - 1\right)$ 

1 ....





### 25) Venturi Head given Theoretical Discharge through Pipe 🕑

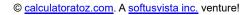


# Variables Used

- **A**<sub>f</sub> Cross Section Area 2 (Square Meter)
- A<sub>i</sub> Cross Section Area 1 (Square Meter)
- **a**<sub>o</sub> Area of Orifice (Square Meter)
- C<sub>c</sub> Coefficient of Contraction
- Cd Coefficient of Discharge
- C<sub>v</sub> Coefficient of Velocity
- H Difference in Liquid Level (Meter)
- HBottom Height of Liquid Bottom Edge (Meter)
- H<sub>f</sub> Height of Fluid
- **H**<sub>Top</sub> Height of Liquid Top Edge (Meter)
- hventuri Venturi Head (Millimeter)
- L Length of Venturi meter (Meter)
- Qactual Actual Discharge (Cubic Meter per Second)
- Qo Discharge through Orifice (Cubic Meter per Second)
- Qth Theoretical Discharge (Cubic Meter per Second)
- V Actual Velocity (Meter per Second)
- V<sub>1</sub> Velocity at Point 1 (Meter per Second)
- V<sub>p2</sub> Velocity at Point 2 (Meter per Second)
- Vtheoritical Theoretical Velocity (Meter per Second)
- W Width of Pipe (Meter)
- Yf Specific Weight of Liquid (Kilonewton per Cubic Meter)



• *w* Weight per unit Volume of Manometer Fluid (*Newton per Cubic Meter*)





# **Constants, Functions, Measurements used**

- Constant: [g], 9.80665 Gravitational acceleration on Earth
- Function: sqrt, sqrt(Number) A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- Measurement: Length in Millimeter (mm), Meter (m) Length Unit Conversion
- Measurement: Area in Square Meter (m<sup>2</sup>) Area Unit Conversion
- Measurement: Speed in Meter per Second (m/s)
   Speed Unit Conversion
- Measurement: Volumetric Flow Rate in Cubic Meter per Second (m<sup>3</sup>/s) Volumetric Flow Rate Unit Conversion
- Measurement: Specific Weight in Kilonewton per Cubic Meter (kN/m<sup>3</sup>), Newton per Cubic Meter (N/m<sup>3</sup>)
   Specific Weight Unit Conversion

- Buoyancy And Floatation
   Formulas
- Culverts Formulas G
- Devices to Measure Flow Rate
   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

9/1/2024 | 9:49:12 AM UTC

<u>Please leave your feedback here...</u>



