



[calculatoratoz.com](http://calculatoratoz.com)



[unitsconverters.com](http://unitsconverters.com)

# Coefficient of Permeability Formulas

Calculators!

Examples!

Conversions!

Bookmark [calculatoratoz.com](http://calculatoratoz.com), [unitsconverters.com](http://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 21 Coefficient of Permeability Formulas

## Coefficient of Permeability

### 1) Coefficient of Permeability at any Temperature t for Standard Value of Coefficient of Permeability

$$\text{fx } K_t = \frac{K_s \cdot v_s}{v_t}$$

[Open Calculator !\[\]\(a870788d6ed9b8fd294b7654a8c8526b\_img.jpg\)](#)

$$\text{ex } 4.17\text{cm/s} = \frac{8.34 \cdot 12\text{m}^2/\text{s}}{24\text{m}^2/\text{s}}$$

### 2) Coefficient of Permeability at Temperature of Permeameter Experiment

$$\text{fx } K = \left( \frac{Q}{A} \right) \cdot \left( \frac{1}{\frac{\Delta H}{L}} \right)$$

[Open Calculator !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d\_img.jpg\)](#)

$$\text{ex } 5.85\text{cm/s} = \left( \frac{3.0\text{m}^3/\text{s}}{100\text{m}^2} \right) \cdot \left( \frac{1}{\frac{2}{3.9\text{m}}} \right)$$



### 3) Coefficient of Permeability from Analogy of Laminar Flow (Hagen Poiseuille flow)

$$\text{fx } K_{H-P} = C \cdot (d_m^2) \cdot \frac{\frac{\gamma}{1000}}{\mu}$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235\_img.jpg\)](#)

$$\text{ex } 0.441315\text{cm/s} = 1.8 \cdot ((0.02\text{m})^2) \cdot \frac{\frac{9.807\text{kN/m}^3}{1000}}{1.6\text{Pa}\cdot\text{s}}$$

### 4) Coefficient of Permeability when Specific or Intrinsic Permeability is Considered

$$\text{fx } K = K_o \cdot \left( \frac{\frac{\gamma}{1000}}{\mu} \right)$$

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0\_img.jpg\)](#)

$$\text{ex } 6.049693\text{cm/s} = 0.00987\text{m}^2 \cdot \left( \frac{\frac{9.807\text{kN/m}^3}{1000}}{1.6\text{Pa}\cdot\text{s}} \right)$$

### 5) Coefficient of Permeability when Transmissibility is Considered

$$\text{fx } k = \frac{T}{b}$$

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f\_img.jpg\)](#)

$$\text{ex } 23.33333\text{cm/s} = \frac{3.5\text{m}^2/\text{s}}{15\text{m}}$$



## 6) Cross-Sectional Area when Coefficient of Permeability at Permeameter Experiment is Considered

$$\text{fx } A = \frac{Q}{K \cdot \left(\frac{\Delta H}{L}\right)}$$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95\_img.jpg\)](#)

$$\text{ex } 97.5\text{m}^2 = \frac{3.0\text{m}^3/\text{s}}{6\text{cm}/\text{s} \cdot \left(\frac{2}{3.9\text{m}}\right)}$$

## 7) Discharge when Coefficient of Permeability at Permeameter Experiment is Considered

$$\text{fx } Q = K \cdot A \cdot \left(\frac{\Delta H}{L}\right)$$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2\_img.jpg\)](#)

$$\text{ex } 3.076923\text{m}^3/\text{s} = 6\text{cm}/\text{s} \cdot 100\text{m}^2 \cdot \left(\frac{2}{3.9\text{m}}\right)$$

## 8) Dynamic Viscosity of Fluid of Laminar Flow through Conduit or Hagen Poiseuille Flow

$$\text{fx } \mu = (C \cdot d_m^2) \cdot \left(\frac{\frac{\gamma}{1000}}{K_{H-P}}\right)$$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7\_img.jpg\)](#)

$$\text{ex } 1.601143\text{Pa}\cdot\text{s} = \left(1.8 \cdot (0.02\text{m})^2\right) \cdot \left(\frac{\frac{9.807\text{kN}/\text{m}^3}{1000}}{0.441\text{cm}/\text{s}}\right)$$



## 9) Dynamic Viscosity when Specific or Intrinsic Permeability is Considered

$$\text{fx } \mu = K_o \cdot \left( \frac{\frac{\gamma}{1000}}{K} \right)$$

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a\_img.jpg\)](#)

$$\text{ex } 1.613252 \text{Pa} \cdot \text{s} = 0.00987 \text{m}^2 \cdot \left( \frac{\frac{9.807 \text{kN/m}^3}{1000}}{6 \text{cm/s}} \right)$$

## 10) Equation for Specific or Intrinsic Permeability

$$\text{fx } K_o = C \cdot d_m^2$$

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021\_img.jpg\)](#)

$$\text{ex } 0.00072 \text{m}^2 = 1.8 \cdot (0.02 \text{m})^2$$

## 11) Equivalent Permeability when Transmissivity of Aquifer is Considered

$$\text{fx } K_e = \frac{\tau}{b}$$

[Open Calculator !\[\]\(bd3b31712ad9bab5a241210fa6925cdd\_img.jpg\)](#)

$$\text{ex } 9.333333 \text{cm/s} = \frac{1.4 \text{m}^2/\text{s}}{15 \text{m}}$$



## 12) Hagen Poiseuille Flow or Mean Particle Size of Porous Medium Laminar Flow through Conduit

[Open Calculator !\[\]\(eafc244b53721dd1ec133f0772f70fc7\_img.jpg\)](#)

$$\text{fx } d_m = \sqrt{\frac{K_{H-P} \cdot \mu}{C \cdot \left(\frac{\gamma}{1000}\right)}}$$

$$\text{ex } 0.019993\text{m} = \sqrt{\frac{0.441\text{cm/s} \cdot 1.6\text{Pa}\cdot\text{s}}{1.8 \cdot \left(\frac{9.807\text{kN/m}^3}{1000}\right)}}$$

## 13) Kinematic Viscosity and Dynamic Viscosity Relation

[Open Calculator !\[\]\(10f8862fc183b400327470ea85afe9ae\_img.jpg\)](#)

$$\text{fx } \nu = \frac{\mu}{\rho_{\text{fluid}}}$$

$$\text{ex } 0.001605\text{m}^2/\text{s} = \frac{1.6\text{Pa}\cdot\text{s}}{997\text{kg/m}^3}$$

## 14) Kinematic Viscosity at 20 degree Celsius for Standard Value of Coefficient of Permeability

[Open Calculator !\[\]\(35dc653d59570f8f891c312eeece91a2\_img.jpg\)](#)

$$\text{fx } \nu_s = \frac{K_t \cdot v_t}{K_s}$$

$$\text{ex } 0.12\text{m}^2/\text{s} = \frac{4.17\text{cm/s} \cdot 24\text{m}^2/\text{s}}{8.34}$$



## 15) Kinematic Viscosity for Standard Value of Coefficient of Permeability



$$fx \quad v_t = \frac{K_s \cdot v_s}{K_t}$$

Open Calculator

$$ex \quad 24m^2/s = \frac{8.34 \cdot 12m^2/s}{4.17cm/s}$$

## 16) Kinematic Viscosity when Specific or Intrinsic Permeability is Considered

$$fx \quad v = \frac{K_o \cdot g}{k}$$

Open Calculator

$$ex \quad 0.96726m^2/s = \frac{0.00987m^2 \cdot 9.8m/s^2}{10cm/s}$$

## 17) Length when Coefficient of Permeability at Permeameter Experiment is Considered

$$fx \quad L = \frac{\Delta H \cdot A \cdot K}{Q}$$

Open Calculator

$$ex \quad 4m = \frac{2 \cdot 100m^2 \cdot 6cm/s}{3.0m^3/s}$$



## 18) Specific or Intrinsic Permeability when Coefficient of Permeability is Considered

$$\text{fx } K_o = \frac{K \cdot \mu}{\frac{\gamma}{1000}}$$

[Open Calculator !\[\]\(6605b201d6f14d9b3bcb8ab5f274d107\_img.jpg\)](#)

$$\text{ex } 0.009789\text{m}^2 = \frac{6\text{cm/s} \cdot 1.6\text{Pa}\cdot\text{s}}{\frac{9.807\text{kN/m}^3}{1000}}$$

## 19) Specific or Intrinsic Permeability when Dynamic Viscosity is Considered

$$\text{fx } K_o = \frac{K \cdot \mu}{\frac{\gamma}{1000}}$$

[Open Calculator !\[\]\(e8fb589d58dad1692debababa5e928b6\_img.jpg\)](#)

$$\text{ex } 0.009789\text{m}^2 = \frac{6\text{cm/s} \cdot 1.6\text{Pa}\cdot\text{s}}{\frac{9.807\text{kN/m}^3}{1000}}$$

## 20) Standard Value of Coefficient of Permeability

$$\text{fx } K_s = K_t \cdot \left( \frac{v_t}{v_s} \right)$$

[Open Calculator !\[\]\(4688aadfd656ded00cd6bdfae55089a9\_img.jpg\)](#)

$$\text{ex } 8.34 = 4.17\text{cm/s} \cdot \left( \frac{24\text{m}^2/\text{s}}{12\text{m}^2/\text{s}} \right)$$





## 21) Unit weight of fluid

**fx**  $\gamma = \rho_{\text{fluid}} \cdot g$

Open Calculator 

**ex**  $9.7706 \text{ kN/m}^3 = 997 \text{ kg/m}^3 \cdot 9.8 \text{ m/s}^2$



## Variables Used










- **A** Cross-Sectional Area (*Square Meter*)
- **b** Aquifer Thickness (*Meter*)
- **C** Shape Factor
- **d<sub>m</sub>** Mean Particle Size of the Porous Medium (*Meter*)
- **g** Acceleration due to Gravity (*Meter per Square Second*)
- **k** Coefficient of Permeability (*Centimeter per Second*)
- **K** Coefficient of Permeability at 20° C (*Centimeter per Second*)
- **K<sub>e</sub>** Equivalent Permeability (*Centimeter per Second*)
- **K<sub>H-P</sub>** Coefficient of Permeability (Hagen-Poiseuille) (*Centimeter per Second*)
- **K<sub>o</sub>** Intrinsic Permeability (*Square Meter*)
- **K<sub>s</sub>** Standard Coefficient of Permeability at 20°C
- **K<sub>t</sub>** Coefficient of Permeability at any Temperature *t* (*Centimeter per Second*)
- **L** Length (*Meter*)
- **Q** Discharge (*Cubic Meter per Second*)
- **T** Transmissibility (*Square Meter per Second*)
- **v<sub>s</sub>** Kinematic Viscosity at 20° C (*Square Meter per Second*)
- **v<sub>t</sub>** Kinematic Viscosity at *t*° C (*Square Meter per Second*)
- **γ** Unit Weight of Fluid (*Kilonewton per Cubic Meter*)
- **ΔH** Constant Head Difference
- **μ** Dynamic Viscosity of the Fluid (*Pascal Second*)
- **v** Kinematic Viscosity (*Square Meter per Second*)



- **P<sub>fluid</sub>** Density of Fluid (Kilogram per Cubic Meter)
- **T** Transmissivity (Square Meter per Second)



## Constants, Functions, Measurements used

- **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 Meter (m)  
*Length Unit Conversion* 
- **Measurement:** **Area** in Square Meter (m<sup>2</sup>)  
*Area Unit Conversion* 
- **Measurement:** **Speed** in Centimeter per Second (cm/s)  
*Speed Unit Conversion* 
- **Measurement:** **Acceleration** in Meter per Square Second (m/s<sup>2</sup>)  
*Acceleration Unit Conversion* 
- **Measurement:** **Volumetric Flow Rate** in Cubic Meter per Second (m<sup>3</sup>/s)  
*Volumetric Flow Rate Unit Conversion* 
- **Measurement:** **Dynamic Viscosity** in Pascal Second (Pa\*s)  
*Dynamic Viscosity Unit Conversion* 
- **Measurement:** **Kinematic Viscosity** in Square Meter per Second (m<sup>2</sup>/s)  
*Kinematic Viscosity Unit Conversion* 
- **Measurement:** **Density** in Kilogram per Cubic Meter (kg/m<sup>3</sup>)  
*Density Unit Conversion* 
- **Measurement:** **Specific Weight** in Kilonewton per Cubic Meter (kN/m<sup>3</sup>)  
*Specific Weight Unit Conversion* 



## Check other formula lists

- **Aquifer Analysis and Properties Formulas** 
- **Coefficient of Permeability Formulas** 
- **Distance Drawdown Analysis Formulas** 
- **Open Wells Formulas** 
- **Steady Flow into a Well Formulas** 
- **Unconfined Flow Formulas** 
- **Unsteady Flow in a Confined Aquifer Formulas** 
- **Well Parameters Formulas** 

Feel free to SHARE this document with your friends!

## PDF Available in

[English](#) [Spanish](#) [French](#) [German](#) [Russian](#) [Italian](#) [Portuguese](#) [Polish](#) [Dutch](#)

7/29/2024 | 5:11:05 AM UTC

[Please leave your feedback here...](#)

