



Number of Theoretical Plates and Capacity Factor 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 15 Number of Theoretical Plates and Capacity Factor Formulas

Number of Theoretical Plates and Capacity Factor

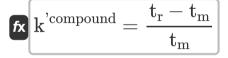
1) Capacity Factor given Partition Coefficient and Volume of Mobile and Stationary Phase

$$\mathbf{k}^{\mathrm{c'1}} = \mathrm{K} \cdot \left(rac{\mathrm{V_s}}{\mathrm{V_{mobile\,phase}}}
ight)$$

Open Calculator

$$egin{aligned} \mathsf{ex} \ \mathsf{56} = 40 \cdot \left(rac{7 \mathrm{L}}{5 \mathrm{L}}
ight) \end{aligned}$$

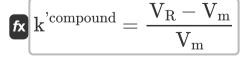
2) Capacity Factor given Retention Time and Mobile Phase Travel Time 🗗



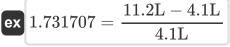
Open Calculator 🗗

$$= 1.708333 = \frac{13s - 4.8s}{4.8s}$$

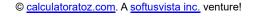
3) Capacity Factor given Retention Volume and Unretained Volume



Open Calculator

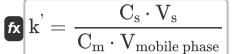








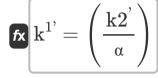
4) Capacity Factor given Stationary Phase and Mobile Phase



Open Calculator 🚰

$$2.333333 = \frac{10 \text{mol/L} \cdot 7 \text{L}}{6 \text{mol/L} \cdot 5 \text{L}}$$

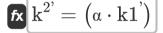
5) Capacity Factor of Solute 1 given Relative Retention



Open Calculator

$$\begin{array}{c} \textbf{ex} \ 0.388889 = \left(\frac{3.5}{9}\right) \end{array}$$

6) Capacity Factor of Solute 2 given Relative Retention



Open Calculator 🛂

$$\boxed{22.5 = (9 \cdot 2.5)}$$

7) Height of Column given Number of Theoretical Plates

$$\mathbf{K} \left[\mathbf{H}_{\mathrm{TP}} = \left(rac{\mathrm{L}}{\mathrm{N}}
ight)
ight]$$

$$\boxed{2.2\mathrm{m} = \left(\frac{22\mathrm{m}}{10}\right)}$$





8) Number of Theoretical Plates given Length and Height of Column 🗗

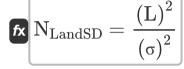


$$N_{
m LandH} = \left(rac{
m L}{
m H}
ight)$$

Open Calculator

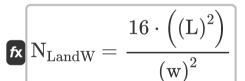
 $\mathbf{ex} \ 1.833333 = \left(\frac{22m}{12m}\right)$

9) Number of Theoretical Plates given Length of Column and Standard Deviation C



Open Calculator 2

10) Number of Theoretical Plates given Length of Column and Width of Peak 🔽



Open Calculator



11) Number of Theoretical Plates given Resolution and Separation Factor

 $\mathbf{N}_{ ext{RandSF}} = rac{\left(4 \cdot \mathrm{R}
ight)^2}{\left(eta - 1
ight)^2}$

Open Calculator 🚰

12) Number of Theoretical Plates given Retention Time and Half Width of Peak

 $N_{
m RTandHP} = rac{5.55 \cdot (t_{
m r})^2}{\left(w_{1/2{
m av}}
ight)^2}$

Open Calculator 🗗

 $oxed{ex} 26.05417 = rac{5.55 \cdot (13 \mathrm{s})^2}{\left(6 \mathrm{s}
ight)^2}$

13) Number of Theoretical Plates given Retention Time and Standard Deviation

 $N_{
m RTandSD} = rac{\left({
m t_r}
ight)^2}{\left(\sigma
ight)^2}$

Open Calculator 🖒





14) Number of Theoretical Plates given Retention Time and Width of Peak

 $N_{ ext{RTandWP}} = rac{16 \cdot \left(\left(ext{t}_{ ext{r}}
ight)^2
ight)}{\left(ext{w}
ight)^2}$

Open Calculator

 $oxed{ex} 281.3736 = rac{16 \cdot \left((13 \mathrm{s})^2
ight)}{\left(3.1 \mathrm{s}
ight)^2}$

15) Separation Factor given Resolution and Number of Theoretical Plates

 $eta_{ ext{TP}} = \left(\left(rac{4 \cdot ext{R}}{\sqrt{ ext{N}}}
ight) + 1
ight)$

Open Calculator

$$\boxed{14.91402 = \left(\left(\frac{4\cdot11}{\sqrt{10}}\right) + 1\right)}$$



Variables Used

- C_m Concentration of Mobile Phase (Mole per Liter)
- **C**_s Concentration of Stationary Phase (Mole per Liter)
- **H** Plate Height (Meter)
- **H**_{TP} Plate Height given TP (*Meter*)
- K Partition Coefficient
- **k** Capacity Factor
- k¹ Capacity Factor of 1
- k^{2'} Capacity Factor of 2
- k^{c'1} Capacity Factor given partition Coeff
- k'compound Capacity Factor of the Compound
- k1 Capacity Factor of Solute 1
- k2 Capacity Factor of Solute 2
- L Length of Column (Meter)
- N Number of Theoretical Plates
- N_{LandH} Number of Theoretical Plates given L and H
- N_{I andSD} Number of Theoretical Plates given L and SD
- N_{LandW} Number of Theoretical Plates given L and W
- N_{RandSF} Number of Theoretical Plates given R and SF
- NRTandHP Number of Theoretical Plates given RT and HP
- N_{RTandSD} Number of Theoretical Plates given RT and SD





- N_{RTandWP} Number of Theoretical Plates given RT and WP
- R Resolution
- tm Unretained Solute Travel Time (Second)
- t_r Retention Time (Second)
- V_m Unretained Mobile Phase Volume (*Liter*)
- V_{mobile phase} Volume of Mobile Phase (Liter)
- **V**_R Retention Volume (*Liter*)
- V_s Volume of Stationary Phase (Liter)
- w Width of Peak (Second)
- W_{1/2av} Half of Average Width of Peaks (Second)
- α Relative Retention
- β Separation Factor
- β_{TP} Separation Factor given TP
- σ Standard Deviation





Constants, Functions, Measurements used

- Function: sqrt, sqrt(Number)
 Square root function
- Measurement: Length in Meter (m)

 Length Unit Conversion
- Measurement: Time in Second (s)
 Time Unit Conversion
- Measurement: Volume in Liter (L)
 Volume Unit Conversion
- Measurement: Molar Concentration in Mole per Liter (mol/L)
 Molar Concentration Unit Conversion





Check other formula lists

- Atmospheric Chemistry Formulas
- Chemical Bonding Formulas
- EPR Spectroscopy Formulas Photochemistry Formulas
- Nuclear Chemistry Formulas
- Organic Chemistry Formulas
- Periodic Table and Periodicity Formulas [7

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

2/7/2024 | 5:27:45 AM UTC

Please leave your feedback here...



