



# Number of Theoretical Plates Formulas

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## List of 9 Number of Theoretical Plates Formulas

#### Number of Theoretical Plates &

1) Height of Column given Number of Theoretical Plates

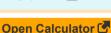


Open Calculator 2

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

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

2) Number of Theoretical Plates given Length and Height of Column

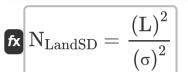


$$N_{
m LandH} = \left(rac{
m L}{
m H}
ight)$$

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



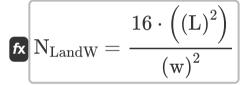
### 3) Number of Theoretical Plates given Length of Column and Standard Deviation



Open Calculator

$$oxed{ex} 0.290326 = rac{(22 ext{m})^2}{(40.83)^2}$$

### 4) Number of Theoretical Plates given Length of Column and Width of Peak



Open Calculator 🗗

$$ext{ex} 805.8273 = rac{16 \cdot \left( (22 ext{m})^2 
ight)}{\left( 3.1 ext{s} 
ight)^2}$$

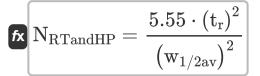
### 5) Number of Theoretical Plates given Resolution and Separation Factor

$$N_{
m RandSF} = rac{\left(4 \cdot {
m R}
ight)^2}{\left(eta - 1
ight)^2}$$





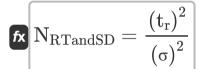
### 6) Number of Theoretical Plates given Retention Time and Half Width of Peak



Open Calculator

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

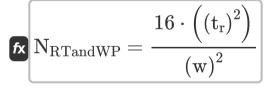
### 7) Number of Theoretical Plates given Retention Time and Standard Deviation



Open Calculator 🗗

$$= \frac{0.101374 = \frac{(13\text{s})^2}{(40.83)^2}$$

### 8) Number of Theoretical Plates given Retention Time and Width of Peak



Open Calculator

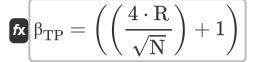
$$= 281.3736 = \frac{16 \cdot \left( (13s)^2 \right)}{\left( 3.1s \right)^2}$$





#### 9) Separation Factor given Resolution and Number of Theoretical Plates





Open Calculator 🖸

ex 
$$14.91402 = \left(\left(\frac{4\cdot 11}{\sqrt{10}}\right) + 1\right)$$





#### Variables Used

- **H** Plate Height (Meter)
- **H**<sub>TP</sub> Plate Height given TP (*Meter*)
- L Length of Column (Meter)
- N Number of Theoretical Plates
- N<sub>I andH</sub> Number of Theoretical Plates given L and H
- N<sub>I andSD</sub> Number of Theoretical Plates given L and SD
- N<sub>I andW</sub> Number of Theoretical Plates given L and W
- N<sub>RandSF</sub> Number of Theoretical Plates given R and SF
- NRTandHP Number of Theoretical Plates given RT and HP
- N<sub>RTandSD</sub> Number of Theoretical Plates given RT and SD
- NRTandWP Number of Theoretical Plates given RT and WP
- R Resolution
- t<sub>r</sub> Retention Time (Second)
- w Width of Peak (Second)
- W<sub>1/2av</sub> Half of Average Width of Peaks (Second)
- β Separation Factor
- β<sub>TP</sub> 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





#### Check other formula lists

- Distribution Ratio and Length of Important formulae on Retention Column Formulas
- **Capacity Factor Formulas**
- and Deviation Formulas
- Number of Theoretical Plates and Relative and Adjusted Retention and Phase Formulas

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