Relative and Adjusted Retention and Phase Formulas...





## Relative and Adjusted Retention and Phase Formulas

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## List of 13 Relative and Adjusted Retention and Phase Formulas

## Relative and Adjusted Retention and Phase C



fx 
$$\operatorname{tr} \operatorname{C1}' = \left(\frac{\operatorname{tr2}'}{\alpha}\right)$$
  
ex  $1.111111s = \left(\frac{10s}{9}\right)$ 

2) Adjusted Retention of Second Component given Relative Retention

fx 
$$\mathrm{tr}\mathrm{C2^{'}}=\left( lpha \cdot \mathrm{tr}1^{'}
ight)$$

ex  $45\mathrm{s} = (9\cdot5\mathrm{s})$ 

### 3) Mobile Phase Travel Time given Capacity Factor 🕑







Open Calculator

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 4) Mobile Phase Travel Time through Column 
$$\checkmark$$

 fx
  $t_C = (t_r - tr')$ 

 fx
  $t_C = (t_r - tr')$ 

 ex
 11s = (13s - 2s)

 5) Molar Concentration of Third Component in First Phase  $\checkmark$ 

 fx
  $C_{P1} = ((k_{DC}') \cdot C_{s2})$ 

 ex
 273mol/L = (10.5 \cdot 26mol/L)

 6) Molar Concentration of Third Component in Second Phase  $\checkmark$ 

 fx
  $C_{P2} = \left(\frac{C_1}{k_{DC}'}\right)$ 

 ex
 1.904762mol/L =  $\left(\frac{20mol/L}{10.5}\right)$ 

 7) Partition Coefficient of Solute 1 given Relative Retention  $\checkmark$ 

fx 
$$K_{C1} = \left(\frac{K_2}{\alpha}\right)$$
  
ex  $1.666667 = \left(\frac{15}{9}\right)$ 





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# 8) Partition Coefficient of Solute 2 given Relative Retention 💪 Open Calculator fx $\mathrm{K}_{\mathrm{C2}} = (lpha \cdot \mathrm{K}_1)$ **ex** $54 = (9 \cdot 6)$ 9) Relative Retention given Adjusted Retention Times 💪 Open Calculator $\left| \alpha_{\mathrm{R}} = \left( rac{\mathrm{tr}2^{'}}{\mathrm{tr}1^{'}} ight) \right|$ ex $2 = \left(\frac{10s}{5s}\right)$ 10) Relative Retention given Capacity Factor of Two Components 💪 Open Calculator 🕑 fx $\alpha_{ m R} = \left(rac{{ m k2}^{'}}{{ m k1}^{'}} ight)$ **ex** $1.4 = \left(\frac{3.5}{2.5}\right)$ 11) Relative Retention given Partition Coefficient of Two Components 💪

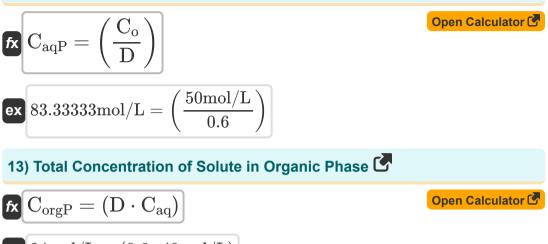
Open Calculator fx  $lpha_{
m R}=\left(rac{
m K_2}{
m K_1}
ight)$ **ex**  $2.5 = \left(\frac{15}{6}\right)$ 





Relative and Adjusted Retention and Phase Formulas...

### 12) Total Concentration of Solute in Aqueous Phase 🖸



ex  $24 \mathrm{mol/L} = (0.6 \cdot 40 \mathrm{mol/L})$ 



## Variables Used

- **C**<sub>1</sub> Concentration of Solute in Solvent 1 (*Mole per Liter*)
- Cag Concentration in Aqueous Phase (Mole per Liter)
- CagP Concentration in Aqueous Solvent (Mole per Liter)
- Concentration in Organic Phase (Mole per Liter)
- CorgP Concentration in Organic Solvent (Mole per Liter)
- C<sub>P1</sub> Concentration of Solute in Phase1 (Mole per Liter)
- Cp2 Concentration of Solute in Phase2 (Mole per Liter)
- C<sub>s2</sub> Solute Concentration in Solvent2 (Mole per Liter)
- D Distribution Ratio
- K1 Partition Coefficient of Solute 1
- K<sub>2</sub> Partition Coefficient of Solute 2
- K<sub>C1</sub> Partition Coefficient of Comp 1
- K<sub>C2</sub> Partition Coefficient of Comp 2
- **k<sub>DC</sub>'** Distribution Coefficient of Solution
- k Capacity Factor
- k1 Capacity Factor of Solute 1
- k2 Capacity Factor of Solute 2
- **t<sub>C</sub>** Unretained Solute Travel Time through Column (Second)
- **t<sub>CP</sub>** Unretained Solute Travel Time given CP (Second)
- t<sub>r</sub> Retention Time (Second)



- **tr** Adjusted Retention Time (Second)
- tr1 Adjusted Retention Time of Solute 1 (Second)
- **tr2** Adjusted Retention Time of Solute 2 (Second)
- **trC1** Adjusted Retention Time of Comp 1 (Second)
- trC2' Adjusted Retention Time of Comp 2 (Second)
- α Relative Retention
- α<sub>R</sub> Actual Relative Retention





## **Constants, Functions, Measurements used**

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





### Check other formula lists

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

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