Important Distribution Ratio and Length of Column Formulas PDF

Formulas
Examples
with Units

List of 15
Important Distribution Ratio and Length of Column Formulas

1) Change in Retention Time given Half of Average Width of Peaks Formula

Evaluate Formula

Formula

$$\Delta t_{r\_H} = \frac{R \cdot w_{1/2av}}{0.589}$$

Example with Units

$$112.0543\,\text{s} = \frac{11 \cdot 6\,\text{s}}{0.589}$$

2) Change in Retention Time given Resolution and Average Width of Peak Formula

Evaluate Formula

Formula

$$\Delta t_{r\_RandW} = \left(R \cdot w_{av} \right)$$

Example with Units

$$44\,\text{s} = \left(11 \cdot 4\,\text{s} \right)$$

3) Change in Retention Volume given Resolution and Average Width of Peak Formula

Evaluate Formula

Formula

$$\Delta V_{r\_RandW} = \left(R \cdot w_{av} \right)$$

Example with Units

$$733333.3333\,\text{mL} = \left(11 \cdot 4\,\text{s} \right)$$

4) Column Length given Number of Theoretical Plates Formula

Evaluate Formula

Formula

$$L_c = \left(N \cdot H \right)$$

Example with Units

$$120\,\text{m} = \left(10 \cdot 12\,\text{m} \right)$$

5) Column Length given Number of Theoretical Plates and Standard Deviation Formula

Evaluate Formula

Formula

$$L_c = \sigma \cdot \left(\sqrt{N} \right)$$

Example with Units

$$129.1158\,\text{m} = 40.83 \cdot \left(\sqrt{10} \right)$$

6) Column Length given Number of Theoretical Plates and Width of Peak Formula

Evaluate Formula

Formula

$$L_{cl} = \left(\frac{w_{NandL}}{4} \right) \cdot \left(\sqrt{N} \right)$$

Example with Units

$$9.8821\,\text{m} = \left(\frac{12.5}{4} \right) \cdot \left(\sqrt{10} \right)$$

7) Column Length given Standard Deviation and Plate Height Formula

Evaluate Formula

Formula

$$L_c = \frac{(\sigma)^2}{H}$$

Example with Units

$$138.9241\,\text{m} = \frac{(40.83)^2}{12\,\text{m}}$$

8) Distribution Ratio Formula

Evaluate Formula

Formula

$$D_{actual} = \left(\frac{C_o}{C_{aq}}\right)$$

Example with Units

$$1.25 = \left(\frac{50\,\text{mol/L}}{40\,\text{mol/L}}\right)$$

9) Distribution Ratio of Solute A given Separation Factor Formula

Evaluate Formula

Formula

$$D_{RA} = \left(\beta \cdot D_B\right)$$

Example

$$182 = (7 \cdot 26)$$

10) Distribution Ratio of Solute B given Separation Factor Formula

Evaluate Formula

Formula

$$D_{RB} = \left(\frac{D_A}{\beta}\right)$$

Example

$$7.4286 = \left(\frac{52}{7}\right)$$

11) Plate Height given Standard Deviation and Length of Column Formula

Evaluate Formula

Formula

$$H_{SD} = \frac{(\sigma)^2}{L}$$

Example with Units

$$168.3928\,\text{m} = \frac{(40.83)^2}{9.9\,\text{m}}$$

12) Separation Factor of two solutes A and B Formula

Evaluate Formula

Formula

$$\beta_{sp} = \left(\frac{D_A}{D_B}\right)$$

Example

$$2 = \left(\frac{52}{26}\right)$$

13) Standard Deviation given Length of Column and Number of Theoretical Plates Formula

Evaluate Formula

Formula

$$\sigma_{LandN} = \frac{L}{\sqrt{N}}$$

Example with Units

$$3.1307 = \frac{9.9\,\text{m}}{\sqrt{10}}$$

14) Standard Deviation given Plate Height and Length of Column Formula

Evaluate Formula

Formula

$$\sigma_{HandL} = \sqrt{H \cdot L}$$

Example with Units

$$10.8995 = \sqrt{12\,\text{m} \cdot 9.9\,\text{m}}$$

15) Width of Peak given Number of Theoretical Plates and Length of Column Formula

Evaluate Formula

Formula

$$w_{NandL} = \frac{4 \cdot L}{\sqrt{N}}$$

Example with Units

$$12.5226 = \frac{4 \cdot 9.9\,\text{m}}{\sqrt{10}}$$

Variables used in list of Distribution Ratio and Length of Column Formulas above

- C_{aq} Concentration in Aqueous Phase *(Mole per Liter)*
- C_o Concentration in Organic Phase *(Mole per Liter)*
- D_A Distribution Ratio of Solute A
- D_{actual} Actual Distribution Ratio
- D_B Distribution Ratio of Solute B
- D_{RA} Distribution Ratio A
- D_{RB} Distribution Ratio B
- H Plate Height *(Meter)*
- H_{SD} Plate Height given SD *(Meter)*
- L Length of Column *(Meter)*
- L_c Chromatographic Column Length *(Meter)*
- L_{cl} Chromatographic Column Length given NP and WP *(Meter)*
- N Number of Theoretical Plates
- R Resolution
- $w_{1/2av}$ Half of Average Width of Peaks *(Second)*
- w_{av} Average Width of Peaks *(Second)*
- w_{NandL} Width of Peak N and L
- β Separation Factor
- β_{sp} Separation Factor A and B
- Δt_{r_H} Change in Retention Time given H *(Second)*
- Δt_{r_RandW} Change in Retention Time given R and W *(Second)*
- ΔV_{r_RandW} Change in retention volume given Rand W *(Milliliter)*
- σ Standard Deviation
- σ_{HandL} Standard Deviation given H and L
- σ_{LandN} Standard Deviation given L and N

Constants, Functions, Measurements used in list of Distribution Ratio and Length of Column Formulas above

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

Download other Important Chemistry PDFs

- Important Atmospheric Chemistry Formulas
- Important Chemical Bonding Formulas
- Important EPR Spectroscopy Formulas
- Important Organic Chemistry Formulas
- Important Periodic Table and Periodicity Formulas
- Important Photochemistry Formulas

Try our Unique Visual Calculators

- Percentage change
- LCM of two numbers
- Proper fraction

Please SHARE this PDF with someone who needs it!

This PDF can be downloaded in these languages

English Spanish French German Russian Italian Portuguese Polish Dutch

7/9/2024 | 1:45:24 PM UTC