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Retention Time Formulas

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List of 10 Retention Time Formulas

Retention Time ⎘

1) Adjusted Retention Time given Retention Time ⎘

fx $t'_{RT} = (t_r - t_m)$

Open Calculator ⎘

ex $8.2s = (13s - 4.8s)$

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

fx $w_{av\_RT} = \left(\dfrac{\Delta t_r}{R}\right)$

Open Calculator ⎘

ex $1.090909s = \left(\dfrac{12s}{11}\right)$

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

fx $w_{1/2av} = \left(\sqrt{\dfrac{5.55}{N}}\right) \cdot (t_r)$

Open Calculator ⎘

ex $9.684782s = \left(\sqrt{\dfrac{5.55}{10}}\right) \cdot (13s)$

4) Retention Time given Adjusted Retention Time ⎘

fx $t_{ART} = (tr' + t_m)$

ex $6.8s = (2s + 4.8s)$

5) Retention Time given Capacity Factor ⎘

fx $T_{cf} = t_m \cdot (k^c + 1)$

ex $21.6s = 4.8s \cdot (3.5 + 1)$

6) Retention Time given Number of Theoretical Plate and Half Width of Peak ⎘

fx $t_{NP\_HP} = (w_{1/2av}) \cdot \left(\sqrt{\dfrac{N}{5.55}} \right)$

ex $8.053873s = (6s) \cdot \left(\sqrt{\dfrac{10}{5.55}} \right)$

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

fx $t_{NP\_SD} = (\sigma) \cdot \left(\sqrt{N} \right)$

ex $129.1158s = (40.83) \cdot \left(\sqrt{10} \right)$

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

Open Calculator ⬈

fx $$t_{NP\_WP} = \left(\frac{w}{4}\right) \cdot \left(\sqrt{N}\right)$$

ex $$2.450765s = \left(\frac{3.1s}{4}\right) \cdot \left(\sqrt{10}\right)$$

9) Retention Time given Retention Volume ⬈

Open Calculator ⬈

fx $$t_{RV} = \left(\frac{V_R}{F_M}\right)$$

ex $$1.6s = \left(\frac{11.2L}{7L/s}\right)$$

10) Width of Peak given Number of Theoretical Plates and Retention Time ⬈

Open Calculator ⬈

fx $$w_{NPandRT} = \frac{4 \cdot t_r}{\sqrt{N_{TP}}}$$

ex $$18.38478s = \frac{4 \cdot 13s}{\sqrt{8}}$$

Variables Used

- F_M Flow Rate of Mobile Phase *(Liter per Second)*

- k^C Capacity Factor for Analytical

- N Number of Theoretical Plates

- N_{TP} Count of Theoretical Plates

- R Resolution

- t_{ART} Retention Time given ART *(Second)*

- T_{cf} Retention Time given CF *(Second)*

- t_m Unretained Solute Travel Time *(Second)*

- t_{NP_HP} Retention Time given NP and HP *(Second)*

- t_{NP_SD} Retention Time given NP and SD *(Second)*

- t_{NP_WP} Retention Time given NP and WP *(Second)*

- t_r Retention Time *(Second)*

- t'_{RT} Adjusted Retention Time given RT *(Second)*

- t_{RV} Retention Time given RV *(Second)*

- tr' Adjusted Retention Time *(Second)*

- V_R Retention Volume *(Liter)*

- w Width of Peak *(Second)*

- $w_{1/2av}$ Half of Average Width of Peaks *(Second)*

- w_{av_RT} Average Width of Peaks given RT *(Second)*

- $w_{NPandRT}$ Width of Peak NP and RT *(Second)*

- Δt_r Change in Retention Time *(Second)*

- **σ** Standard Deviation

Constants, Functions, Measurements used

- **Function**: **sqrt**, sqrt(Number)
  Square root function
- **Measurement**: **Time** in Second (s)
  Time Unit Conversion 🔗
- **Measurement**: **Volume** in Liter (L)
  Volume Unit Conversion 🔗
- **Measurement**: **Volumetric Flow Rate** in Liter per Second (L/s)
  Volumetric Flow Rate Unit Conversion 🔗

Check other formula lists

- **Number of Theoretical Plates Formulas** ⤤
- **Capacity factor Formulas** ⤤
- **Change in Retention Time and Volume Formulas** ⤤
- **Distribution Ratio Formulas** ⤤
- **Length of Column Formulas** ⤤
- **Phase Formulas** ⤤
- **Relative and Adjusted Retention Formulas** ⤤

- **Resolution Formulas** ⤤
- **Retention Time Formulas** ⤤
- **Retention Volume Formulas** ⤤
- **Scaling Equation Formulas** ⤤
- **Standard Deviation Formulas** ⤤
- **Van Deemter Equation Formulas** ⤤
- **Volume and Concentration of Mobile and Stationary Phase Formulas** ⤤

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