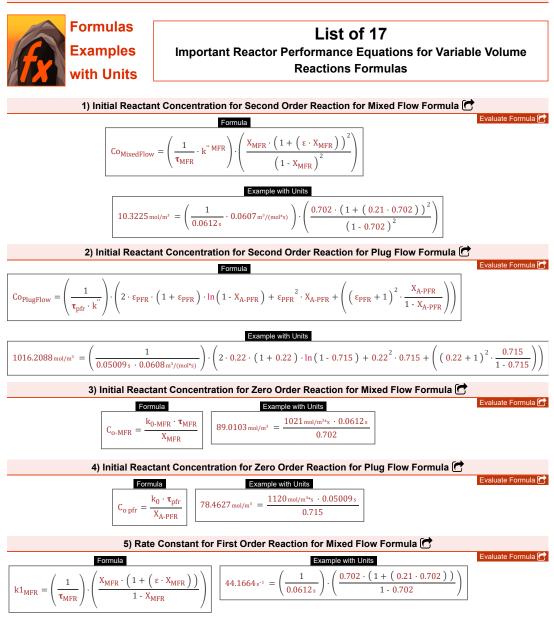
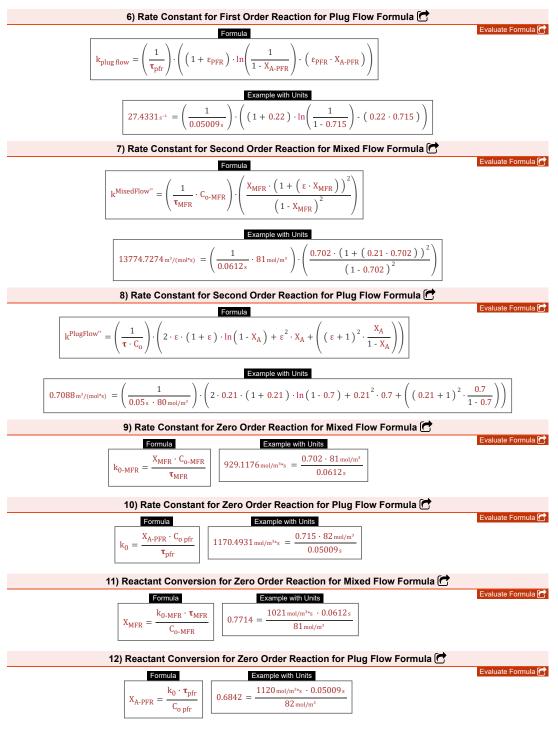
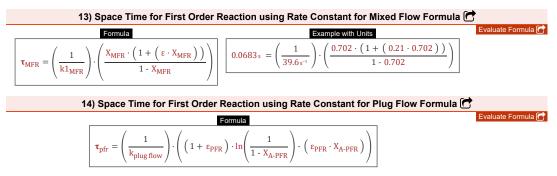
Important Reactor Performance Equations for Variable Volume Reactions Formulas PDF











 $\boxed{\begin{array}{l} \text{Example with Units} \\ 0.0348_{\text{s}} = \left(\frac{1}{39.5_{\text{s}^{-1}}}\right) \cdot \left(\left(1 + 0.22\right) \cdot \ln\left(\frac{1}{1 - 0.715}\right) - \left(0.22 \cdot 0.715\right)\right) \end{array}}$

15) Space Time for Second Order Reaction using Rate Constant for Mixed Flow Formula 🕝

Evaluate Formula

Evaluate Formula

Evaluate Formula

Formula	
$\tau_{MixedFlow} = \left(\frac{1}{k^{''MFR}} \cdot C_{o-MFR}\right)$	$\left(\frac{X_{MFR}\cdot\left(1+\left(\epsilon\cdot X_{MFR}\right)\right)^{2}}{\left(1\cdot X_{MFR}\right)^{2}}\right)$

$$13888.193_{s} = \left(\frac{1}{0.0607 \, \mathrm{m}^{3}/(\mathrm{mol}^{*}\mathrm{s})} \cdot 81 \, \mathrm{mol/m}^{3}\right) \cdot \left(\frac{0.702 \cdot (1 + (0.21 \cdot 0.702))^{2}}{(1 \cdot 0.702)^{2}}\right)$$

16) Space Time for Zero Order Reaction using Rate Constant for Mixed Flow Formula 🕝

 $\label{eq:TMFR} \begin{array}{|c|c|c|} \hline \textbf{Formula} & \textbf{Example with Units} \\ \hline \textbf{T}_{MFR} = \frac{\textbf{X}_{MFR} \cdot \textbf{C}_{o-MFR}}{\textbf{k}_{0-MFR}} & 0.0557_{s} = \frac{0.702 \cdot 81 \, \text{mol}/\text{m}^{3}}{1021 \, \text{mol}/\text{m}^{3} \text{s}} \end{array}$

17) Space Time for Zero Order Reaction using Rate Constant for Plug Flow Formula



Variables used in list of Reactor Performance Equations for Variable Volume Reactions Formulas above

- C o pfr Initial Reactant Concentration in PFR (Mole per Cubic Meter)
- Co Initial Reactant Concentration (Mole per Cubic Meter)
- C_{o-MFR} Initial Reactant Concentration in MFR (Mole per Cubic Meter)
- Co_{MixedFlow} Initial Reactant Conc for 2nd Order Mixed Flow (Mole per Cubic Meter)
- CoplugFlow Initial Reactant Conc for 2nd Order Plug Flow (Mole per Cubic Meter)
- k₀ Rate Constant for Zero Order Reaction (Mole per Cubic Meter Second)
- k_{0-MFR} Rate Constant for Zero Order Reaction in MFR (Mole per Cubic Meter Second)
- k_{plug flow} Rate Constant for First Order in Plug Flow (1 Per Second)
- **k**^{"MFR} Rate Constant for Second Order Reaction in MFR (*Cubic Meter per Mole Second*)
- **k** Rate Constant for Second Order Reaction (Cubic Meter per Mole Second)
- k^{MixedFlow"} Rate Constant for 2ndOrder Reaction for Mixed Flow (*Cubic Meter per Mole Second*)
- k^{PlugFlow"} Rate Constant for 2nd Order Reaction for Plug Flow (Cubic Meter per Mole Second)
- k1_{MFR} Rate Constant for First Order Reaction in MFR (1 Per Second)
- X_A Reactant Conversion
- XA-PFR Reactant Conversion in PFR
- XMFR Reactant Conversion in MFR
- ε Fractional Volume Change in Reactor
- ε Fractional Volume Change
- ε_{PFR} Fractional Volume Change in PFR
- τ Space Time (Second)
- τ_{MFR} Space Time in MFR (Second)
- τ_{MixedFlow} Space Time for Mixed Flow (Second)
- τ_{pfr} Space Time in PFR (Second)

Constants, Functions, Measurements used in list of Reactor Performance Equations for Variable Volume Reactions Formulas above

- Functions: In, In(Number) The natural logarithm, also known as the logarithm to the base e, is the inverse function of the natural exponential function.
- Measurement: Time in Second (s)
 Time Unit Conversion
- Measurement: Molar Concentration in Mole per Cubic Meter (mol/m³)

Molar Concentration Unit Conversion 👉

Measurement: Reaction Rate in Mole per Cubic Meter Second (mol/m³*s)

Reaction Rate Unit Conversion

 Measurement: First Order Reaction Rate Constant in 1 Per Second (s⁻¹)

First Order Reaction Rate Constant Unit Conversion 순

 Measurement: Second Order Reaction Rate Constant in Cubic Meter per Mole Second (m³/(mol*s)) Second Order Reaction Rate Constant Unit Conversion



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