



Basics of Non Ideal Flow Formulas

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Examples!

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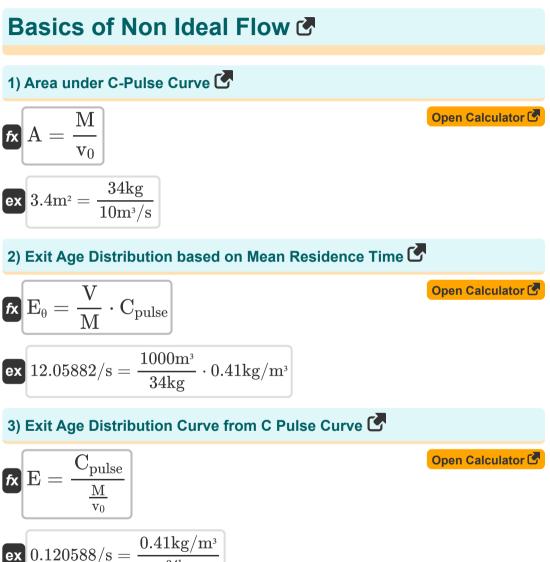
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List of 10 Basics of Non Ideal Flow Formulas



$$imes 0.120588/{
m s} = rac{0.41 {
m kg/m^3}}{rac{34 {
m kg}}{10 {
m m^3/s}}}$$



4) F Curve C
(a) F =
$$\frac{C_{step}}{C_{A0}}$$

(b) $F = \frac{C_{step}}{C_{A0}}$
(c) $0.482874 = \frac{42.01 \text{mol/m}^3}{87 \text{mol/m}^3}$
5) Initial Concentration of Reactant in Plug Flow Reactant with Negligible
Density Changes (c)
(c) $C_{Ao} = C_A \cdot \exp(\tau_p \cdot k_{plug flow})$
(c) $C_{Ao} = C_A \cdot \exp(\tau_p \cdot k_{plug flow})$
(c) $P_X = \frac{C_A \cdot \exp(\tau_p \cdot k_{plug flow})}{24 \text{mol/m}^3 \cdot \exp(0.069s \cdot 20.05 \text{mol/m}^3 \cdot s)}$
(c) Mean of C Pulse Curve (c)
(c) $T = \frac{V}{v_0}$
(c) $T = \frac{V}{v_0}$
(c) $100s = \frac{1000m^3}{10m^3/s}$
(c) Rate Constant for Plug Flow Reactor using Space Time for Negligible Density Changes (c)
(c) $R_{plug flow} = \left(\frac{1}{\tau_p}\right) \cdot \ln\left(\frac{C_{Ao}}{C_A}\right)$

ex
$$17.44888 \text{mol/m}^3 \text{*s} = \left(\frac{1}{0.069 \text{s}}\right) \cdot \ln\left(\frac{80 \text{mol/m}^3}{24 \text{mol/m}^3}\right)$$

nture!



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8) Space Time for Plug Flow Reactor with Negligible Density Changes 🛃

9) Volume of Reactor based on Exit Age Distribution

fx
$$V = \frac{E_{\theta} \cdot M}{C_{pulse}}$$
 Open Calculator C
ex $995.122m^3 = \frac{12/s \cdot 34kg}{0.41kg/m^3}$

10) Volumetric Flow Rate based on Mean Pulse Curve

fx
$$v_0 = \frac{V}{T}$$

ex $10 \text{m}^3/\text{s} = \frac{1000 \text{m}^3}{100 \text{s}}$



Open Calculator

Variables Used

- **A** Area under Curve (Square Meter)
- CA Reactant Concentration (Mole per Cubic Meter)
- CA0 Initial Concentration of Reactant (Mole per Cubic Meter)
- CAo Initial Reactant Conc. (Mole per Cubic Meter)
- **C**_{pulse} C Pulse (Kilogram per Cubic Meter)
- Cstep C Step (Mole per Cubic Meter)
- E Exit Age Distribution (1 Per Second)
- **E**_θ E in Mean Residence Time (1 Per Second)
- **F** F Curve
- k_{plug flow} Rate Constant for Plug Flow Reactor (Mole per Cubic Meter Second)
- **M** Units of Tracer (Kilogram)
- T Mean Pulse Curve (Second)
- V Volume of Reactor (Cubic Meter)
- V₀ Volumetric Flow Rate of Feed to Reactor (Cubic Meter per Second)
- τ_p Space Time for Plug Flow Reactor (Second)



Constants, Functions, Measurements used

- Function: **exp**, exp(Number) Exponential function
- Function: In, In(Number) Natural logarithm function (base e)
- Measurement: Weight in Kilogram (kg) Weight Unit Conversion
- Measurement: Time in Second (s) Time Unit Conversion
- Measurement: Volume in Cubic Meter (m³) Volume Unit Conversion
- Measurement: Area in Square Meter (m²) Area Unit Conversion
- Measurement: Volumetric Flow Rate in Cubic Meter per Second (m³/s)
 Volumetric Flow Rate Unit Conversion
- Measurement: Molar Concentration in Mole per Cubic Meter (mol/m³)
 Molar Concentration Unit Conversion
- Measurement: Density in Kilogram per Cubic Meter (kg/m³) Density Unit Conversion
- Measurement: Reaction Rate in Mole per Cubic Meter Second (mol/m^{3*}s) Reaction Rate Unit Conversion
- Measurement: Time Inverse in 1 Per Second (1/s) Time Inverse Unit Conversion



Check other formula lists

- Basics of Non Ideal Flow
 Formulas
- Convection Model for Laminar Flow Formulas
- Dispersion Model Formulas
- Earliness of Mixing,Segregation,RTD Formulas

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