Steam or Gas Stripping Stages (Kremser)

Theoretical stages of a counter-current stripper with a straight equilibrium line from the liquid inlet and outlet and the stripping gas, by the Kremser equation.

Method: Perry's Chemical Engineers' Handbook; 9th ed. (McGraw-Hill, 2019); ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Solute in the liquid entering (mole fraction)	0.10000	%
Solute in the liquid leaving	0.001000	%
Solute in the stripping gas entering	0	%
Equilibrium slope y = mx	30.000	
Stripping gas to liquid molar ratio	0.050000	

Calculated results

Parameter	Value	Unit
Stripping factor mV/L	1.5000	
Theoretical stages	8.6971	
Fraction stripped	99.000	%

Formula and method

$$\frac{x_{in}-x_{out}}{x_{in}-y_{in}/m}=\frac{S^{N+1}-S}{S^{N+1}-1},\quad S=\frac{mV}{L}$$

Variables

x_{in}	Solute in the liquid entering (mole fraction)	-
x_{out}	Solute in the liquid leaving	-
y_{in}	Solute in the stripping gas entering	-
m	Equilibrium slope y = mx	-
V/L	Stripping gas to liquid molar ratio	-
S	Stripping factor mV/L	-
N	Theoretical stages	-
ϕ_S	Fraction stripped	-

Method and standards

Kremser stripping form solved for N.

Assumptions and limits

- Dilute; straight equilibrium; isothermal.

References

- Perry's Chemical Engineers' Handbook
- 9th ed. (McGraw-Hill, 2019)
- sec. 13 (distillation)
- Kremser equation for strippers

Report details

Report reference	FCC-EFEE-DYSH (the same inputs always give the same reference)
Generated	17 November 2026, 19:46 UTC
Calculator	Steam or Gas Stripping Stages (Kremser)
Method last reviewed	13 November 2026
Software release	FireCAD Calc, release of 17 November 2026
Release checks	2 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/chemical/separation/kremser-stripping-stages

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.