Chemical Dosing Pump: Solution Flow and Stroke Setting

Solution flow and stroke setting to dose a chemical at a concentration, from the solution strength and density and the pump's capacity.

Method: Mass balance: active chemical = flow × dose; solution = active/(strength × density)

Input parameters

Unit system: SI

Parameter	Value	Unit
Water or feedwater flow	50.000	t/h
Dose of active chemical	5.0000	ppm
Active strength of the dosing solution	5.0000	%
Solution density	1,030.0	kg/m³
Pump capacity at 100 % stroke	10.000	L/h

Calculated results

Parameter	Value	Unit
Active chemical	0.25000	kg/h
Solution flow	4.8544	L/h
Stroke setting	48.544	%

Formula and method

$$\dot{m}_a = \dot{m}_w c, \quad \dot{V}_s = \frac{\dot{m}_a}{w \rho_s}, \quad s = \frac{\dot{V}_s}{\dot{V}_{max}}$$

Variables

$\dot{m}_w$	Water or feedwater flow	kg/s
c	Dose of active chemical	-
w	Active strength of the dosing solution	-
ρ_s	Solution density	kg/m³
$\dot{V}_{max}$	Pump capacity at 100 % stroke	m³/s
$\dot{m}_a$	Active chemical	kg/s
$\dot{V}_s$	Solution flow	m³/s
s	Stroke setting	-

Method and standards

Mass balance.

Assumptions and limits

- Linear pump. A stroke above 100 % means the pump is too small; a note says so.

References

- Mass balance: active chemical = flow × dose; solution = active/(strength × density)

Report details

Report reference	FCC-KDTP-DPM7 (the same inputs always give the same reference)
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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/boilers-power-plant/water-treatment/chemical-dosing-pump-setting

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.