CIP: Caustic per Clean and per Year

Caustic soda for one cleaning-in-place make-up from the CIP solution volume, strength and density and the caustic purity, and the yearly use.

Method: Mass balance m = V ρ w / p

Input parameters

Unit system: SI

Parameter	Value	Unit
CIP solution volume per clean	10.000	m³
Caustic strength of the solution (w/w)	2.0000	%
Solution density	1,020.0	kg/m³
Caustic purity (flake 0.98, lye 0.48)	48.000	%
Cleans per year	300.00	

Calculated results

Parameter	Value	Unit
NaOH (100 %) per clean	204.00	kg
Commercial caustic per clean	425.00	kg
Commercial caustic per year	127.50	t

Notes for this case

- Recovered CIP caustic is topped up rather than remade: use the top-up volume for recovery systems.

Formula and method

$$m_{NaOH} = V\rho w, \quad m_p = \frac{m_{NaOH}}{p}, \quad M_a = m_p N$$

Variables

V	CIP solution volume per clean	m³
w	Caustic strength of the solution (w/w)	-
ρ	Solution density	kg/m³
p	Caustic purity (flake 0.98, lye 0.48)	-
N	Cleans per year	-
m_{NaOH}	NaOH (100 %) per clean	kg
m_p	Commercial caustic per clean	kg
M_a	Commercial caustic per year	kg

Method and standards

Mass balance.

Assumptions and limits

- Fresh make-up of the whole volume every clean; with caustic recovery enter the top-up volume instead.

References

- Mass balance m = V ρ w / p

Report details

Report reference	FCC-PW0J-01XZ (the same inputs always give the same reference)
Generated	17 November 2026, 19:35 UTC
Calculator	CIP: Caustic per Clean and per Year
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/sugar-ethanol/ethanol/cip-chemical

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.