Chlorine Dose, Hypochlorite Quantity and CT Value

Chlorine dose from demand and residual, chlorine per day for a flow, the quantity of hypochlorite or bleaching powder at its available chlorine, and the CT value.

Method: Mass balance of available chlorine; CT = residual × contact time (US EPA disinfection practice)

Input parameters

Unit system: SI

Parameter	Value	Unit
Water flow	500.00	m³/d
Chlorine demand	1.5000	mg/L
Residual wanted	0.50000	mg/L
Available chlorine of the product (mass fraction, w/w) About 0.1–0.15 for sodium hypochlorite solution, 0.3 for bleaching powder, 0.65–0.7 for calcium hypochlorite; from the supplier.	10.000	%
Product density (solution)	1,200.0	kg/m³
Contact time	30.000	min

Calculated results

Parameter	Value	Unit
Dose D + C_r	2.0000	mg/L
Chlorine per day	1.0000	kg/d
Product per day	10.000	kg/d
Product volume per day	0.34722	L/h
CT value (mg·min/L)	15.000	

Notes for this case

- CT uses the residual and the contact time; compare with the CT your regulator requires for the organism, pH and temperature.

Formula and method

$$d = D + C_r, \quad \dot{m} = Qd, \quad \dot{m}_p = \frac{\dot{m}}{x}, \quad CT = C_r\, t$$

Variables

Q	Water flow	m³/s
D	Chlorine demand	kg/m³
C_r	Residual wanted	kg/m³
x	Available chlorine of the product (mass fraction, w/w)	-
ρ	Product density (solution)	kg/m³
t	Contact time	s
d	Dose D + C_r	kg/m³
$\dot{m}$	Chlorine per day	kg/s
$\dot{m}_p$	Product per day	kg/s
$\dot{V}_p$	Product volume per day	m³/s
CT	CT value (mg·min/L)	-

Method and standards

Mass balance.

Assumptions and limits

- Steady flow.
- Available chlorine as a mass fraction. Hypochlorite sold by 'trade %' (g/L of available chlorine divided by 10) is a volume basis: divide it by the density in kg/L for x (10 % trade at 1.2 kg/L is 8.3 % w/w).

References

- Mass balance of available chlorine; CT = residual × contact time (US EPA disinfection practice)

Report details

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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/civil/hydraulics/chlorine-dose

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.