Chlorine Dose for Coliform Kill by the Collins-Selleck Model

Combined chlorine residual for a coliform target by the refined Collins-Selleck model, and the dose including immediate demand and decay in the contact tank.

Input parameters

Unit system: SI

Parameter	Value	Unit
Coliform before disinfection (per 100 mL)	1,000,000	
Coliform target (per 100 mL)	2.2000	
Contact time	90.000	min
Slope n	2.8000	
Lag (shoulder) CT, mg·min/L	4.0000	
Immediate chlorine demand	1.5000	mg/L
Decay in the contact tank	1.0000	mg/L

Calculated results

Parameter	Value	Unit
Required CT	419.40	
Required combined residual	4.6599	mg/L
Chlorine dose	7.1599	mg/L

Notes for this case

• N/N_o = (CT/b)^(−n) for CT above b (no kill below the shoulder). The typical values for combined chlorine on secondary effluent are n = 2.8 and b = 4.0 mg·min/L; confirm them by testing the actual effluent.

Formula and method

$$\frac{N}{N_o} = \left(\frac{CT}{b}\right)^{-n}, \quad C = \frac{b}{t}\left(\frac{N}{N_o}\right)^{-1/n}, \quad C_{dose} = C + D_i + D_d$$

Variables

N_o	Coliform before disinfection (per 100 mL)	-
N	Coliform target (per 100 mL)	-
t	Contact time	s
n	Slope n	-
b	Lag (shoulder) CT, mg·min/L	-
D_i	Immediate chlorine demand	kg/m³
D_d	Decay in the contact tank	kg/m³
CT	Required CT	-
C	Required combined residual	kg/m³
C_{dose}	Chlorine dose	kg/m³

Method and standards

Refined Collins-Selleck model.

Assumptions and limits

- Coefficients site-specific; combined chlorine.

Report details

Report reference	FCC-WVBK-G8EV (the same inputs always give the same reference)
Generated	23 November 2026, 17:42 UTC
Calculator	Chlorine Dose for Coliform Kill by the Collins-Selleck Model
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
Release checks	3 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/environmental/wastewater/collins-selleck-chlorine-dose

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.