Chlorine Disinfection: CT Value and Contact Tank

CT achieved by a chlorine contact tank from residual, volume, flow and baffling factor (t_{10}), against a required CT, and the tank volume to meet it.

Method: US EPA; Disinfection Profiling and Benchmarking Guidance Manual (EPA 815-R-99-013): CT = C × t_{10} and baffling factors

Input parameters

Unit system: SI

Parameter	Value	Unit
Free chlorine residual at the outlet	1.0000	mg/L
Contact tank volume	400.00	m³
Peak flow	10,000	m³/d
Baffling factor t_{10}/T	0.50000	
Required CT (mg·min/L)	30.000	

Calculated results

Parameter	Value	Unit
Theoretical detention time	57.600	min
Effective contact time	28.800	min
CT achieved (mg·min/L)	28.800	
Ratio to the requirement	0.96000	
Tank volume to meet the requirement	416.67	m³

Notes for this case

- Baffling factors: 0.1 unbaffled, 0.3 poor, 0.5 average, 0.7 superior, 1.0 plug flow (US EPA guidance). Required CT depends on organism, log credit, pH and temperature.

Formula and method

$$T = \frac{V}{Q}, \quad t_{10} = BF \cdot T, \quad CT = C t_{10}, \quad V_{req} = V \frac{CT_{req}}{CT}$$

Variables

C	Free chlorine residual at the outlet	kg/m³
V	Contact tank volume	m³
Q	Peak flow	m³/s
BF	Baffling factor t_{10}/T	-
CT_{req}	Required CT (mg·min/L)	-
T	Theoretical detention time	s
t_{10}	Effective contact time	s
CT	CT achieved (mg·min/L)	-
CT/CT_{req}	Ratio to the requirement	-
V_{req}	Tank volume to meet the requirement	m³

Method and standards

CT concept.

Assumptions and limits

- Steady flow; residual at the outlet.

References

- US EPA
- Disinfection Profiling and Benchmarking Guidance Manual (EPA 815-R-99-013): CT = C × t_{10} and baffling factors

Report details

Report reference	FCC-ZDHF-B17C (the same inputs always give the same reference)
Generated	17 November 2026, 19:46 UTC
Calculator	Chlorine Disinfection: CT Value and Contact Tank
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/environmental/wastewater/chlorine-ct-contact-time

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.