Anaerobic Digester Volume from COD Loading

Digester volume from the COD load and the organic loading rate, and the hydraulic retention time for the spent wash flow.

Method: V = COD load / OLR; HRT = V/Q

Input parameters

Unit system: SI

Parameter	Value	Unit
COD load	110.00	t/d
Organic loading rate	8.0000	kg/(m³·d)
Spent wash flow	1,000.0	m³/d

Calculated results

Parameter	Value	Unit
Digester volume	13,750	m³
Hydraulic retention time	13.750	d

Notes for this case

- The loading rate depends on the reactor type (lagoon, CSTR, UASB, fixed film): use the designer's figure.

Formula and method

$$V = \frac{L_{COD}}{OLR}, \quad HRT = \frac{V}{\dot{V}}$$

Variables

L_{COD}	COD load	kg/s
OLR	Organic loading rate	kg/(m³·s)
$\dot{V}$	Spent wash flow	m³/s
V	Digester volume	m³
HRT	Hydraulic retention time	s

Method and standards

Definitions.

Assumptions and limits

- Steady load.

References

- V = COD load / OLR; HRT = V/Q

Report details

Report reference	FCC-337A-4PAM (the same inputs always give the same reference)
Generated	17 November 2026, 19:37 UTC
Calculator	Anaerobic Digester Volume from COD Loading
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/spent-wash-zld/anaerobic-digester-volume

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.