Filter Backwash: Flow, Volume and Water Used

Backwash flow and water volume for a sand or multimedia filter from bed area, backwash rate and duration, with the share of filtered water used.

Method: Q_b = A v_b; V_b = Q_b t_b; filtered = A v_f t_r

Input parameters

Unit system: SI

Parameter	Value	Unit
Filter bed area	30.000	m²
Backwash rate From the media supplier for the media and temperature.	40.000	m/h
Backwash duration	10.000	min
Filtration rate	10.000	m/h
Filter run between washes	24.000	h

Calculated results

Parameter	Value	Unit
Backwash flow	1,200.0	m³/h
Water per wash	200.00	m³
Water filtered per run	7,200.0	m³
Share of filtered water used for washing	2.7778	%

Notes for this case

- Add air scour and rinse-to-waste water if your filters use them.

Formula and method

$$\dot{V}_b = A v_b, \quad V_b = \dot{V}_b t_b, \quad x = \frac{V_b}{A v_f t_r}$$

Variables

A	Filter bed area	m²
v_b	Backwash rate	m/s
t_b	Backwash duration	s
v_f	Filtration rate	m/s
t_r	Filter run between washes	s
$\dot{V}_b$	Backwash flow	m³/s
V_b	Water per wash	m³
V_f	Water filtered per run	m³
x	Share of filtered water used for washing	-

Method and standards

Volume balance.

Assumptions and limits

- One filter washed at a time.
- The share uses the gross filtrate of a run; the filter is off line during the wash and that lost output is not deducted (negligible for long runs).

References

- Q_b = A v_b; V_b = Q_b t_b; filtered = A v_f t_r

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/environmental/wastewater/filter-backwash-volume

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.