Rainwater Recharge Pit: Runoff Volume and Pit Size

Runoff volume from a roof or paved area for a design storm and the recharge pit volume needed after infiltration during the storm, with the drain-down time.

Method: Runoff V = C A R; storage = runoff − infiltration k A_b t

Input parameters

Unit system: SI

Parameter	Value	Unit
Catchment area	1,000.0	m²
Runoff coefficient	85.000	%
Design storm rainfall depth	50.000	mm
Storm duration	2.0000	h
Infiltration rate of the soil From a percolation test at the pit location.	15.000	mm/h
Infiltrating area of the pit (base and sides)	12.000	m²

Calculated results

Parameter	Value	Unit
Runoff volume	42.500	m³
Infiltrated during the storm	0.36000	m³
Pit storage needed	42.140	m³
Drain-down time after the storm	234.11	h

Notes for this case

- Pit volume is the void volume: divide by the porosity of any gravel fill. Keep a filter before the pit.

Formula and method

$$V_r = CAR, \quad V_p = V_r - kA_b t_s, \quad t_d = \frac{V_p}{kA_b}$$

Variables

A	Catchment area	m²
C	Runoff coefficient	-
R	Design storm rainfall depth	m
t_s	Storm duration	s
k	Infiltration rate of the soil	m/s
A_b	Infiltrating area of the pit (base and sides)	m²
V_r	Runoff volume	m³
V_i	Infiltrated during the storm	m³
V_p	Pit storage needed	m³
t_d	Drain-down time after the storm	s

Method and standards

Water balance.

Assumptions and limits

- Uniform infiltration; with zero infiltration no drain-down time is shown.

References

- Runoff V = C A R; storage = runoff − infiltration k A_b t

Report details

Report reference	FCC-RYV2-CH0T (the same inputs always give the same reference)
Generated	17 November 2026, 19:46 UTC
Calculator	Rainwater Recharge Pit: Runoff Volume and Pit Size
Method last reviewed	12 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/groundwater-recharge-pit

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.