Runoff Depth by the SCS Curve Number Method

Direct runoff depth from storm rainfall by the SCS curve number method, with retention, initial abstraction, runoff volume and coefficient.

Method: USDA NRCS; National Engineering Handbook part 630; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Storm rainfall	100.00	mm
Curve number	80.000	
Initial abstraction ratio	0.20000	
Catchment area	100.00	ha

Calculated results

Parameter	Value	Unit
Potential maximum retention	63.500	mm
Initial abstraction	12.700	mm
Runoff depth	50.539	mm
Runoff volume	50,539	m^3
Runoff coefficient	50.539	%

Notes for this case

• S = 25,400/CN − 254 mm. CN from land use, soil hydrologic group and antecedent moisture (USDA TR-55 tables). Use for storm totals, not rainfall intensities.

Formula and method

$$S = \frac{25400}{CN} - 254, \quad Q = \frac{(P - \lambda S)^2}{P - \lambda S + S} \quad (P > \lambda S)$$

Variables

P	Storm rainfall	m
CN	Curve number	-
λ	Initial abstraction ratio	-
A	Catchment area	m^2
S	Potential maximum retention	m
I_a	Initial abstraction	m
Q	Runoff depth	m
V	Runoff volume	m^3
Q/P	Runoff coefficient	-

Method and standards

SCS runoff equation.

Assumptions and limits

- Storm totals; average antecedent moisture.

References

• USDA NRCS
• National Engineering Handbook part 630
• ch. 10 (runoff equation)

Report details

Report reference	FCC-DR5M-WCTB (the same inputs always give the same reference)
Generated	17 November 2026, 19:49 UTC
Calculator	Runoff Depth by the SCS Curve Number Method
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/civil/hydraulics/scs-curve-number-runoff

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.