Sprinkler Irrigation Application Rate and Set Time

Application rate of a sprinkler system from sprinkler flow and spacing, its comparison with the soil's intake rate, and the set time to apply a net depth.

Input parameters

Unit system: SI

Parameter	Value	Unit
Flow per sprinkler	1.2000	m³/h
Spacing along the lateral	12.000	m
Spacing between laterals	12.000	m
Soil basic intake rate (mm per hour)	12.000	
Net depth to apply (mm)	40.000	
Application efficiency	75.000	%

Calculated results

Parameter	Value	Unit
Application rate (mm per hour)	8.3333	
Rate as a share of the intake rate	69.444	%
Gross depth (mm)	53.333	
Set time	6.4000	h

Notes for this case

• Each sprinkler covers a rectangle of S_l × S_m, so the application rate is its flow over that area (1 m³/h over 144 m² is about 7 mm/h). It must stay below the soil's basic intake rate or water runs off. The gross depth is the net depth over the application efficiency, and the set time is gross depth over rate.

Formula and method

$$AR = \frac{q}{S_l S_m}, \quad d_g = \frac{d_n}{\eta_a}, \quad t = \frac{d_g}{AR}$$

Variables

q	Flow per sprinkler	m³/s
S_l	Spacing along the lateral	m
S_m	Spacing between laterals	m
I	Soil basic intake rate (mm per hour)	-
d_n	Net depth to apply (mm)	-
η_a	Application efficiency	-
AR	Application rate (mm per hour)	-
AR/I	Rate as a share of the intake rate	-
d_g	Gross depth (mm)	-
t	Set time	s

Method and standards

Sprinkler rate.

Assumptions and limits

- Uniform overlap; steady flow.

Report details

Report reference	FCC-E9HM-D9X9 (the same inputs always give the same reference)
Generated	23 November 2026, 17:34 UTC
Calculator	Sprinkler Irrigation Application Rate and Set Time
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
Release checks	3 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/irrigation-farm/sprinkler-application-rate

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.