Boom Sprayer Calibration: Nozzle Flow and Tank Coverage

Nozzle output needed for an application rate at a forward speed and nozzle spacing, the area covered by one tank and the chemical per tank.

Method: Sprayer calibration: q = R v w / 600 (L/min, L/ha, km/h, m)

Input parameters

Unit system: SI

Parameter	Value	Unit
Spray volume rate (litres per hectare)	300.00	
Forward speed	6.0000	km/h
Nozzle spacing on the boom (or swath per nozzle)	500.00	mm
Tank volume	600.00	L
Product dose per hectare	1.5000	
Nozzles on the boom	24.000	

Calculated results

Parameter	Value	Unit
Nozzle output needed	1.5000	L/min
Boom output	36.000	L/min
Area per tank	2.0000	ha
Product per tank (same unit as the dose)	3.0000	

Notes for this case

• Each nozzle sprays a strip as wide as the nozzle spacing; at speed v it covers w·v of ground per second, so it must deliver R·w·v. In practical units, q (L/min) = R (L/ha) × v (km/h) × w (m)/600. Measure each nozzle's output into a jug for a minute and replace any more than 10 % off. The tank covers its volume over the rate, which sets the product to add per tank.

Formula and method

$$q = R\,v\,w \quad \left(\mathrm{L/min} = \frac{R[\mathrm{L/ha}]\,v[\mathrm{km/h}]\,w[\mathrm{m}]}{600}\right), \quad A_t = \frac{V_t}{R}$$

Variables

R	Spray volume rate (litres per hectare)	-
v	Forward speed	m/s
w	Nozzle spacing on the boom (or swath per nozzle)	m
V_t	Tank volume	m³
D	Product dose per hectare	-
n	Nozzles on the boom	-
q	Nozzle output needed	m³/s
Q	Boom output	m³/s
A_t	Area per tank	m²
D_t	Product per tank (same unit as the dose)	-

Method and standards

Sprayer calibration.

Assumptions and limits

- Steady speed; uniform nozzles.

References

Sprayer calibration: q = R v w / 600 (L/min, L/ha, km/h, m)

Report details

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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/sprayer-calibration

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.