Duty and Delta of Irrigation Water

Delta (depth of water over the base period) from duty and base period, Δ = 8.64 B/D, with the canal discharge and water volume for an irrigated area.

Method: Classical irrigation engineering relations (duty and delta, Bligh and Lane creep, Khosla exit gradient)

Input parameters

Unit system: SI

Parameter	Value	Unit
Base period	120.00	d
Duty (hectares per m³/s)	1,800.0	
Area to irrigate	5,000.0	ha

Calculated results

Parameter	Value	Unit
Delta	576.00	mm
Discharge needed at the field	2.7778	m³/s
Water over the base period	2.8800e+07	m³

Notes for this case

• Duty is the area one cumec (1 m³/s) can irrigate when run continuously through the base period; delta is the depth of water that gives the crop. One cumec for B days is 86,400B m³ spread over D hectares, so Δ = 8.64B/D metres. Duty is measured at a point and rises toward the field as losses fall; state where it applies. Rice has a high delta (about 1.2 m), wheat about 0.4 m.

Formula and method

$$\Delta = \frac{8.64\,B}{D}$$

Variables

B	Base period	s
D	Duty (hectares per m³/s)	-
A	Area to irrigate	m²
Δ	Delta	m
Q	Discharge needed at the field	m³/s
V	Water over the base period	m³

Method and standards

Duty and delta.

Assumptions and limits

- Continuous flow over the base period.

References

Classical irrigation engineering relations (duty and delta, Bligh and Lane creep, Khosla exit gradient)

Report details

Report reference	FCC-2KYW-7SCN (the same inputs always give the same reference)
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Calculator	Duty and Delta of Irrigation Water
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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/duty-delta-irrigation

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.