Building a Charge out of Water in a Wet Blasthole

Final water height when water-resistant cartridges displace water in a wet blasthole, and the number of cartridges needed to reach it (Dyno Nobel).

Input parameters

Unit system: SI

Parameter	Value	Unit
Original water height in the hole	10.000	ft
Borehole diameter	5.0000	in
Cartridge diameter	4.0000	in
Cartridge length	16.000	in

Calculated results

Parameter	Value	Unit
Final water height	27.778	ft
Cartridges to reach the final water height	20.833	
Whole cartridges (rounded up)	21.000	
Rise of the water level	17.778	ft

Notes for this case

- The water in the hole is pushed up into the annulus round the cartridges; once the cartridge column reaches the final water height, the rest of the hole can take bulk ANFO.

Formula and method

$$F_H = H_o \frac{D_B^2}{D_B^2 - D_E^2}, \quad N_E = \frac{F_H}{L_E}$$

Variables

H_o	Original water height in the hole	m
D_B	Borehole diameter	m
D_E	Cartridge diameter	m
L_E	Cartridge length	m
F_H	Final water height	m
N_E	Cartridges to reach the final water height	-
$N_E{}'$	Whole cartridges (rounded up)	-
$F_H - H_o$	Rise of the water level	m

Method and standards

Dyno Nobel water build-out rule.

Assumptions and limits

- Water is not lost into the rock.

Report details

Report reference	FCC-FXH8-61N3 (the same inputs always give the same reference)
Generated	23 November 2026, 17:26 UTC
Calculator	Building a Charge out of Water in a Wet Blasthole
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/mine-design/blasthole-water-build-out

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.