Open Well Yield by Recuperation Test

Specific yield of an open well from a recuperation test (depression before and after a recovery time) and the safe yield for a working depression head.

Method: Classical engineering hydrology relations: recuperation test of open wells

Input parameters

Unit system: SI

Parameter	Value	Unit
Depression when pumping stops	3.0000	m
Depression after the recovery time	1.0000	m
Recovery time	2.0000	h
Well diameter	5.0000	m
Safe working depression head	2.5000	m

Calculated results

Parameter	Value	Unit
Specific yield (per hour)	0.54931	1/h
Well area	19.635	m²
Safe yield	26.964	m³/h
Safe yield per day	647.14	m³/d

Notes for this case

• After pumping stops, water flows in through the well bottom at a rate proportional to the depression, so the depression decays exponentially: K/A = (1/T)ln(s_1/s_2) = (2.303/T)log(s_1/s_2). The yield at a working depression H is Q = (K/A)·A·H. Working heads are kept below the critical depression that would disturb the soil at the bottom (often 2.5–3.5 m in sand). Typical K/A is about 0.25 per hour in clay, 0.5 in fine sand and 1 in coarse sand.

Formula and method

$$\frac{K}{A} = \frac{2.303}{T} \log \frac{s_1}{s_2}, \quad Q = \frac{K}{A} A H$$

Variables

s_1	Depression when pumping stops	m
s_2	Depression after the recovery time	m
T	Recovery time	s
d	Well diameter	m
H	Safe working depression head	m
K/A	Specific yield (per hour)	1/s
A	Well area	m²
Q	Safe yield	m³/s
Q_d	Safe yield per day	m³/s

Method and standards

Recuperation test.

Assumptions and limits

- Inflow through the bottom only.

References

Classical engineering hydrology relations: recuperation test of open wells

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/hydraulics/open-well-recuperation-test

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.