Ogee Spillway Discharge with Pier and Abutment Contraction

Discharge over an ogee spillway crest from discharge coefficient, head and effective crest length reduced by pier and abutment contraction, and the unit discharge.

Method: Ogee crest discharge equation

Input parameters

Unit system: SI

Parameter	Value	Unit
Discharge coefficient (SI)	2.1500	
Net crest length	60.000	m
Number of piers	4.0000	
Pier contraction coefficient	0.010000	
Abutment contraction coefficient	0.10000	
Total head on the crest	4.0000	m

Calculated results

Parameter	Value	Unit
Effective crest length	58.880	m
Discharge	1,012.7	m³/s
Discharge per metre of crest	17.200	m³/(s·m)

Notes for this case

• Q = C·L_e·H_e^1.5, L_e = L − 2(NK_p + K_a)H_e. C is about 2.1–2.2 (SI) at the design head for a high ogee with negligible approach velocity, lower at smaller heads and for low weirs or submerged tailwater; take it from the design charts for the spillway's shape and head ratio.

Formula and method

$$Q = C L_e H_e^{3/2}, \quad L_e = L - 2(N K_p + K_a) H_e$$

Variables

C	Discharge coefficient (SI)	-
L	Net crest length	m
N	Number of piers	-
K_p	Pier contraction coefficient	-
K_a	Abutment contraction coefficient	-
H_e	Total head on the crest	m
L_e	Effective crest length	m
Q	Discharge	m³/s
q	Discharge per metre of crest	m³/(s·m)

Method and standards

Spillway discharge.

Assumptions and limits

- Free (unsubmerged) flow over a standard crest.

References

Ogee crest discharge equation

Report details

Report reference	FCC-9TZV-3X9S (the same inputs always give the same reference)
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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/boilers-power-plant/hydro-power/ogee-spillway-discharge

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.