Bar Screen Headloss, Clean and Partly Clogged

Headloss through a coarse bar screen from approach and through-bar velocities with clean and clogged discharge coefficients, and the effect of blinding.

Input parameters

Unit system: SI

Parameter	Value	Unit
Approach velocity in the channel	0.90000	m/s
Velocity through the clean screen openings	1.0000	m/s
Fraction of the open area blocked	30.000	%
Discharge coefficient, clean screen	0.70000	
Discharge coefficient, clogged screen	0.60000	

Calculated results

Parameter	Value	Unit
Headloss, clean screen	13.839	mm
Velocity through the clogged screen	1.4286	m/s
Headloss, clogged screen	104.59	mm

Notes for this case

- Mechanically cleaned coarse screens are usually limited to about 150 mm of headloss; the rake starts on a differential level or a timer of about 15 min. Blocking half the open area doubles the through-bar velocity and raises the loss about sevenfold.

Formula and method

$$h_L = \frac{1}{C}\frac{v_s^2 - v^2}{2g}, \quad {v_s}' = \frac{v_s}{1 - f_b}$$

Variables

v	Approach velocity in the channel	m/s
v_s	Velocity through the clean screen openings	m/s
f_b	Fraction of the open area blocked	-
C	Discharge coefficient, clean screen	-
C'	Discharge coefficient, clogged screen	-
h_L	Headloss, clean screen	m
${v_s}'$	Velocity through the clogged screen	m/s
${h_L}'$	Headloss, clogged screen	m

Method and standards

Orifice-type headloss for bar screens.

Assumptions and limits

- Coarse bar screens; fine screens have much higher losses.

Report details

Report reference	FCC-29V8-JR23 (the same inputs always give the same reference)
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Calculator	Bar Screen Headloss, Clean and Partly Clogged
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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/environmental/wastewater/bar-screen-headloss

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.