Phosphate Hideout from Load-Swing Data

Phosphate hiding out at high load and returning at low load, as a share of the low-load concentration and the mass held in the boiler, from load-swing samples.

Method: Definition on load-swing data (same blowdown and dosing conditions)

Input parameters

Unit system: SI

Parameter	Value	Unit
Phosphate at low load (as PO_4; same basis for both samples)	8.0000	mg/L
Phosphate at high load (same basis as at low load)	3.0000	mg/L
Boiler water volume	40.000	m³

Calculated results

Parameter	Value	Unit
Hideout share	62.500	%
Phosphate hidden at high load (on the sample basis)	200.00	g

Notes for this case

- Strong hideout (above 30 %, a screening level used on this page, not from a cited standard): phosphate is depositing on hot surfaces at high heat flux; lower the phosphate level or review the treatment.

Formula and method

$$HO = \frac{c_L - c_H}{c_L}, \quad m = (c_L - c_H)V$$

Variables

c_L	Phosphate at low load (as PO_4; same basis for both samples)	kg/m³
c_H	Phosphate at high load (same basis as at low load)	kg/m³
V	Boiler water volume	m³
HO	Hideout share	-
m	Phosphate hidden at high load (on the sample basis)	kg

Method and standards

Definition.

Assumptions and limits

- Steady dosing and blowdown.
- Both samples on the same basis (as PO_4 or as P); the share does not depend on the basis, the mass is on that basis.
- If the high-load phosphate is the higher, there is no hideout: the share comes out negative and the hidden mass is not shown.
- The 30 % mark for strong hideout is a screening level used on this page, not a cited limit.

References

- Definition on load-swing data (same blowdown and dosing conditions)

Report details

Report reference	FCC-710J-Z4AN (the same inputs always give the same reference)
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Calculator	Phosphate Hideout from Load-Swing Data
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Release checks	2 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/water-treatment/phosphate-hideout-index

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.