Spent Wash Concentration by Multiple-Effect Evaporation

Concentrate and water evaporated when spent wash is concentrated to a target solids, and the steam at a given evaporator steam economy.

Method: Solids balance; steam = evaporation / economy

Input parameters

Unit system: SI

Parameter	Value	Unit
Spent wash	1,040.0	t/d
Solids in spent wash	12.000	%
Solids in concentrate	55.000	%
Steam economy (kg water per kg steam)	4.5000	

Calculated results

Parameter	Value	Unit
Concentrate	226.91	t/d
Water evaporated	813.09	t/d
Steam	7.5286	t/h

Notes for this case

- The evaporator condensate is reused after polishing; scaling limits the final solids.

Formula and method

$$\dot{m}_c = \dot{m}\frac{x_1}{x_2}, \quad \dot{m}_v = \dot{m} - \dot{m}_c, \quad \dot{m}_s = \frac{\dot{m}_v}{E}$$

Variables

$\dot{m}$	Spent wash	kg/s
x_1	Solids in spent wash	-
x_2	Solids in concentrate	-
E	Steam economy (kg water per kg steam)	-
$\dot{m}_c$	Concentrate	kg/s
$\dot{m}_v$	Water evaporated	kg/s
$\dot{m}_s$	Steam	kg/s

Method and standards

Solids balance.

Assumptions and limits

- No solids carry-over.

References

- Solids balance; steam = evaporation / economy

Report details

Report reference	FCC-AFC3-52HQ (the same inputs always give the same reference)
Generated	17 November 2026, 19:50 UTC
Calculator	Spent Wash Concentration by Multiple-Effect Evaporation
Method last reviewed	13 November 2026
Software release	FireCAD Calc, release of 17 November 2026
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/sugar-ethanol/spent-wash-zld/spent-wash-evaporation

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.