Evaporation Pond Area for Effluent or Brine

Surface area of a solar evaporation pond for a daily effluent volume from pan evaporation, pan coefficient, rainfall and a salinity factor.

Method: Water balance of evaporation ponds with pan coefficient

Input parameters

Unit system: SI

Parameter	Value	Unit
Effluent to evaporate per day	50.000	m³
Pan evaporation (mm per day)	6.0000	
Pan coefficient	70.000	%
Average rainfall (mm per day)	2.0000	
Salinity reduction factor of evaporation	80.000	%

Calculated results

Parameter	Value	Unit
Net evaporation (mm per day)	1.3600	
Pond surface area	36,765	m²
Pond area	3.6765	ha

Notes for this case

• A pond loses water at the lake evaporation rate, about 0.7 times the pan evaporation, less for saline water as dissolved salts lower the vapour pressure, and gains the rainfall falling on it. The net rate times the area must match the effluent added. Design on the worst (monsoon or winter) month, not the annual average, and add freeboard and storage for wet periods.

Formula and method

$$E_n = k_p E_p f_s - R, \quad A = \frac{Q}{E_n}$$

Variables

Q	Effluent to evaporate per day	m³
E_p	Pan evaporation (mm per day)	-
k_p	Pan coefficient	-
R	Average rainfall (mm per day)	-
f_s	Salinity reduction factor of evaporation	-
E_n	Net evaporation (mm per day)	-
A	Pond surface area	m²
A_{ha}	Pond area	m²

Method and standards

Evaporation pond.

Assumptions and limits

- Average rates over the design period.

References

Water balance of evaporation ponds with pan coefficient

Report details

Report reference	FCC-45MV-48G6 (the same inputs always give the same reference)
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Calculator	Evaporation Pond Area for Effluent or Brine
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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/evaporation-pond-area

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.