Solar Still Daily Distillate Output

Daily fresh water from a basin solar still from the daily solar radiation, still area, overall efficiency and the latent heat of water at the operating temperature.

Method: Energy balance of a basin solar still

Input parameters

Unit system: SI

Parameter	Value	Unit
Daily solar radiation on the still	5.5000	kWh/m²
Basin (glass) area	2.0000	m²
Overall still efficiency	35.000	%
Mean water temperature in the basin	55.000	°C

Calculated results

Parameter	Value	Unit
Latent heat at the basin temperature	2,369.9	kJ/kg
Distillate per day	5.8484	kg
Distillate per m² per day	2.9242	kg/m²
Area for 1 kg (about 1 L) per day	0.34197	m²

Notes for this case

• m = ηHA/h_fg. Single-basin stills reach about 30–40 % efficiency, about 2–4 L/m² a day in sunny climates. Water and steam properties from IAPWS-IF97.

Formula and method

$$m_d = \frac{\eta H A}{h_{fg}(T_w)}$$

Variables

H	Daily solar radiation on the still	J/m²
A	Basin (glass) area	m²
η	Overall still efficiency	-
T_w	Mean water temperature in the basin	K
h_{fg}	Latent heat at the basin temperature	J/kg
m_d	Distillate per day	kg
m_d/A	Distillate per m² per day	kg/m²
A_{1L}	Area for 1 kg (about 1 L) per day	m²

Method and standards

Solar still energy balance.

Assumptions and limits

- Daily average; efficiency entered.

References

Energy balance of a basin solar still

Report details

Report reference	FCC-HW9Z-S0Q0 (the same inputs always give the same reference)
Generated	23 November 2026, 17:35 UTC
Calculator	Solar Still Daily Distillate Output
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
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/solar-thermal/solar-still-distillate

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.