Pre-Evaporator Evaporation Rate

Evaporation per m² and total of a pre-evaporator from its apparent temperature drop by Hugot's rates (eqns 32.32–32.33: 3.5Δt and 4.5Δt kg/m²/h).

Method: Hugot; Handbook of Cane Sugar Engineering; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Heating surface	2,000.0	m²
Apparent temperature drop	12.000	K
Rate per degree	Modern pre-evaporator (4.5)	

Calculated results

Parameter	Value	Unit
Evaporation per m²	54.000	kg/(m²·h)
Evaporation	108,000	kg/h

Notes for this case

- Pre-evaporators run at high temperature on clear juice and bleed most of their vapour to heaters and pans.

Formula and method

$$\tau = k\,\Delta t\ \left[\mathrm{kg/(m^2\,h)}\right], \quad E = \tau S$$

Variables

S	Heating surface	m²
Δt	Apparent temperature drop	K
k	Rate per degree	-
τ	Evaporation per m²	kg/(m²·s)
E	Evaporation	kg/s

Method and standards

Hugot's empirical rates.

Assumptions and limits

- Clear juice of normal brix.
- A linear rule in the apparent drop; no validity range is stated with it here, so large drops are extrapolations.

References

- Hugot
- Handbook of Cane Sugar Engineering
- 3rd ed. (Elsevier, 1986)
- ch. 32
- pre-evaporators
- eqns 32.32–32.33
- pp. 576–580

Report details

Report reference	FCC-Y5WP-G7EB (the same inputs always give the same reference)
Generated	17 November 2026, 19:46 UTC
Calculator	Pre-Evaporator Evaporation Rate
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/evaporation/pre-evaporator-rate

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.