Continuous Vacuum Pan Volume

Working volume of a continuous vacuum pan from the massecuite flow and residence time, per t cane/h, and the batch pan volume it replaces (about 20 % more, Hugot).

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Crushing rate	200.00	t/h
Massecuite per tonne cane	40.000	L/t
Residence time Suggested from Hugot's continuous pan table (not a figure he states): about 2 h for A, 2.5 h for B and 5 h for C massecuite.	5.0000	h
Batch volume / continuous volume	1.2000	

Calculated results

Parameter	Value	Unit
Massecuite flow	8.0000	m³/h
Continuous pan volume	40.000	m³
Volume per t cane/h (m³ per t/h)	0.20000	m³
Equivalent batch volume	48.000	m³

Notes for this case

- Continuous pans need a regular magma feed of 20 % crystal or more and a steady vacuum and steam supply.

Formula and method

$$\dot{V} = Av, \quad V_c = \dot{V}\tau, \quad V_b = kV_c$$

Variables

A	Crushing rate	kg/s
v	Massecuite per tonne cane	m³/kg
τ	Residence time	s
k	Batch volume / continuous volume	-
$\dot{V}$	Massecuite flow	m³/s
V_c	Continuous pan volume	m³
V_c/A	Volume per t cane/h	m³ per t/h
V_b	Equivalent batch volume	m³

Method and standards

Throughput times residence.

Assumptions and limits

- Steady flow.
- The residence times in the help are derived from Hugot's table, not figures he states; use plant figures where you have them.
- The massecuite per tonne cane must include the magma (seed) fed to the pan; the magma is not a separate input.

References

- Hugot
- Handbook of Cane Sugar Engineering
- 3rd ed. (Elsevier, 1986)
- ch. 33

- continuous pans (Table 33.17 and pp. 711–722)

Report details

Report reference	FCC-KPYH-CTK6 (the same inputs always give the same reference)
Generated	17 November 2026, 19:35 UTC
Calculator	Continuous Vacuum Pan Volume
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/pan-boiling/continuous-pan-volume

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.