Pan Station Steam per Tonne Cane (Hugot)

Steam used by the pans per tonne of cane from the A, B and C massecuite volumes per tonne cane, Hugot's coefficients and the boiling method (eqn 33.29).

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Crushing rate	100.00	t/h
A massecuite per tonne cane Hugot: A 95–140, B 50–55, C 35–40 L per tonne cane.	140.00	L/t
B massecuite per tonne cane	54.000	L/t
C massecuite per tonne cane	36.000	L/t
Massecuite density	1,470.0	kg/m³
Steam per kg A massecuite	0.27500	
Steam per kg B massecuite	0.30000	
Steam per kg C massecuite	0.36000	
Boiling method, A massecuite	Batch pans (1.5)	
Boiling method, B massecuite	Continuous pans (1.2)	
Boiling method, C massecuite	Continuous pans (1.2)	

Calculated results

Parameter	Value	Unit
Steam for A per tonne cane	84.892	kg/t
Steam for B per tonne cane	28.577	kg/t
Steam for C per tonne cane	22.861	kg/t
Total per tonne cane	136.33	kg/t
Pan steam	13.633	t/h

Notes for this case

- Hugot's example: 140, 54 and 36 L/t cane of A (batch pans) and B and C (continuous pans) massecuite take about 137 kg steam per tonne cane.

Formula and method

$$s_i = v_i \, \rho_m \, k_i \, m_i, \quad s = s_A + s_B + s_C, \quad \dot{m}_s = sA$$

Variables

A	Crushing rate	kg/s
v_A	A massecuite per tonne cane	m³/kg
v_B	B massecuite per tonne cane	m³/kg
v_C	C massecuite per tonne cane	m³/kg
ρ_m	Massecuite density	kg/m³
k_A	Steam per kg A massecuite	-
k_B	Steam per kg B massecuite	-
k_C	Steam per kg C massecuite	-
m_A	Boiling method, A massecuite	-

m_B	Boiling method, B massecuite	-
m_C	Boiling method, C massecuite	-
s_A	Steam for A per tonne cane	kg/kg
s_B	Steam for B per tonne cane	kg/kg
s_C	Steam for C per tonne cane	kg/kg
S	Total per tonne cane	kg/kg
$\dot{m}_s$	Pan steam	kg/s

Method and standards

Hugot's eqn 33.29 per massecuite.

Assumptions and limits

- Steam at pan calandria conditions. Hugot's coefficients are kg of heating steam or vapour per kg of massecuite; the page does not correct them for the steam pressure.
- The method factor is 1.2 for continuous pans, 1.5 for batch pans and 2.25 for batch pans that also use jigger steam (live steam blown into the bottom of the pan to help circulation).

References

• Hugot
• Handbook of Cane Sugar Engineering
• 3rd ed. (Elsevier, 1986)
• ch. 33
• eqn 33.29 and example
• pp. 664–667

Report details

Report reference	FCC-GJT6-24ZH (the same inputs always give the same reference)
Generated	17 November 2026, 19:49 UTC
Calculator	Pan Station Steam per Tonne Cane (Hugot)
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/pan-steam-consumption

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.