Mill Delivery Opening from Fibre Loading (Hugot)

Working delivery opening from fibre loading and the density of compressed bagasse with re-absorption (Hugot eqns 10.15, 13.4–13.5), with the fibre index.

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Crushing rate	300.00	t/h
Fibre % cane	15.000	%
Roller speed	6.0000	rpm
Roller diameter	0.99000	m
Roller length	2.1340	m
Fibre % of the bagasse leaving the mill	33.000	%
Density of the juice in the mill	1,040.0	kg/m³
Re-absorption factor Murry: about 1.06 + 0.017 v (v in m/min) at compression 3; 1.1–1.4 usual.	1.3500	

Calculated results

Parameter	Value	Unit
No-void volume of the bagasse	0.86457	L/kg
Density of compressed bagasse	1,156.6	kg/m³
Fibre index f′ d_B r	515.29	kg/m³
Fibre loading	18.833	kg/m²
Working delivery opening	36.550	mm

Formula and method

$$V_0 = \frac{1}{d_J} - \left(\frac{1.20}{d_J} - 0.86 \times 10^{-3}\ \mathrm{m^3/kg}\right) f', \quad d_B = \frac{1}{V_0}, \quad \varphi = f' d_B r, \quad q = \frac{Af}{\pi D n L}, \quad e_A = \frac{q}{\varphi}$$

Variables

A	Crushing rate	kg/s
f	Fibre % cane	-
n	Roller speed	1/s
D	Roller diameter	m
L	Roller length	m
f'	Fibre % of the bagasse leaving the mill	-
d_J	Density of the juice in the mill	kg/m³
r	Re-absorption factor	-
V_0	No-void volume of the bagasse	m³/kg
d_B	Density of compressed bagasse	kg/m³
φ	Fibre index f′ d_B r	kg/m³
q	Fibre loading	kg/m²
e_A	Working delivery opening	m

Method and standards

Hugot's no-void volume of bagasse (fibre density 1.52, fibraque 1.2 × fibre) and continuity through the delivery opening.

Assumptions and limits

- V_o in dm^3/kg in Hugot's form, where the constant is 0.86 dm^3/kg; here it is written in SI as 0.86×10^{-3} m^3/kg with d_J in kg/m^3.

References

- Hugot
- Handbook of Cane Sugar Engineering
- 3rd ed. (Elsevier, 1986)
- ch. 10
- eqns 10.14–10.17
- p. 136; ch. 13
- eqns 13.4–13.5 and the example of pp. 207–211

Report details

Report reference	FCC-QXG4-ZCNE (the same inputs always give the same reference)
Generated	17 November 2026, 19:49 UTC
Calculator	Mill Delivery Opening from Fibre Loading (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/milling/mill-delivery-opening

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.