Bagasse Conveyor Width, Speed and Power (Hugot)

Width of a rubber-belt or scraper bagasse conveyor for its load, its speed from the last mill and its power from chain length, after Hugot pp. 98–99.

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Bagasse to convey	70.000	t/h
Peripheral speed of the last mill	13.000	m/min
Conveyor speed / last-mill speed Hugot: 2–3.	2.5000	
Total conveyor length (upper and lower runs)	120.00	m

Calculated results

Parameter	Value	Unit
Width, rubber belt	1,000.0	mm
Width, scraper conveyor	1,076.9	mm
Conveyor speed	32.500	m/min
Bagasse friction on steel at that speed (eqn 8.15)	0.20250	
Conveyor power (1 kW per 5 m of total length)	24.000	kW

Notes for this case

- Hugot's belt loading: 6 t/h per 100 mm of width for 25–50 t/h, 7 for 50–100 t/h, 8 above; scrapers 6.5 t/h per 100 mm.

Formula and method

$$W_b = \max\left(\frac{\dot{m}_b}{r_b},\ W_{b,\text{previous band}}\right),\ r_b = 6,\ 7,\ 8\ \text{t/h per 100 mm},\quad W_s = \frac{\dot{m}_b}{6.5},\quad v_c = k\,v,\quad \mu = \max(0,\ 0.43 - 0.007\,v_c)\ (v_c \text{ in m/min}),\quad P = \frac{L_c}{5}\ \text{kW}$$

Variables

$\dot{m}_b$	Bagasse to convey	kg/s
v	Peripheral speed of the last mill	m/s
k	Conveyor speed / last-mill speed	-
L_c	Total conveyor length (upper and lower runs)	m
r_b	Hugot's belt loading for the band: 6 (25–50 t/h), 7 (50–100 t/h), 8 (above 100 t/h) t/h per 100 mm	-
$W_{b,\text{previous band}}$	Width at the top of the previous band: 833 mm above 50 t/h, 1 429 mm above 100 t/h	m
W_b	Width, rubber belt	m
W_s	Width, scraper conveyor	m
v_c	Conveyor speed	m/s
μ	Bagasse friction on steel at that speed (eqn 8.15)	-
P	Conveyor power (1 kW per 5 m of total length)	W

Method and standards

Hugot's loading and power rules for bagasse conveyors (Handbook of Cane Sugar Engineering, 3rd ed., p. 99) and his friction relation, eqn 8.15. Hugot's belt bands share their end points at 50 and 100 t/h, so a literal reading makes the width fall just above each; the calculator keeps the width of the band below until the next band needs more.

Assumptions and limits

- Widths are Hugot's loading rules per 100 mm of width; belt speed, layer depth and bagasse density do not enter them.
- The belt width never falls as the load rises: from 50 to about 58 t/h it stays at 833 mm, and from 100 to about 114 t/h at 1 429

mm. Below 25 t/h Hugot gives no belt rule.
- Power is Hugot's average figure for a factory of average size, 1 kW per 5 m of total conveyor length (about twice the carrier length), independent of load, speed and lift.

References

- Hugot
- Handbook of Cane Sugar Engineering
- 3rd ed. (Elsevier, 1986)
- ch. 8
- bagasse conveyors and eqn 8.15
- pp. 98–99

Report details

Report reference	FCC-XQDA-D6H5 (the same inputs always give the same reference)
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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/sugar-ethanol/cane-preparation/bagasse-conveyor

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Reopens the calculator with the inputs of this report.