Mill Setting by the Java Method (Hugot)

Roller speed, working and empty delivery and feed openings of a mill by the Java method: fibre loading, fibre index and lift (Hugot ch. 13, pp. 201–204).

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Crushing rate	120.00	t/h
Fibre % cane	14.000	%
Roller diameter	0.81300	m
Roller length	1.6750	m
Fibre loading for a 762 mm roller From the Java table for the tandem and mill position.	157.00	g/dm²
Fibre index at the delivery opening Grams per litre equal kg/m³. Java table: about 500 at the first mill to 800–900 at the last.	800.00	kg/m³
Lift / working delivery opening Hugot: 0.30 (Helmer 0.20).	30.000	%
Top roller angle (between the two openings)	73.740	°
Corrections to the delivery setting (wear, etc.)	4.0000	mm
Feed / delivery working ratio	1.9000	
Corrections to the feed setting	6.0000	mm

Calculated results

Parameter	Value	Unit
Fibre loading for this diameter	167.51	g/dm²
Roller speed	3.9072	rpm
Working delivery opening	20.938	mm
Opening gained by the lift	5.0252	mm
Empty delivery setting	11.913	mm
Working feed opening	39.783	mm
Empty feed setting	28.758	mm

Notes for this case

- Hugot's example: 120 t/h, 14 % fibre, 813 × 1675 mm rollers give about 3.9 rpm, a 21 mm working delivery and a 12 mm empty setting.

Formula and method

$$q = q_{762}\frac{D}{0.762\ \mathrm{m}},\quad n = \frac{Af}{\pi DLq},\quad e_A = \frac{q}{\varphi},\quad \Delta e = \lambda e_A \cos\frac{\alpha}{2}$$

$$s_0 = e_A - \Delta e - k_d,\quad E_A = m\,e_A,\quad E_0 = E_A - \Delta e - k_f$$

Variables

A	Crushing rate	kg/s
f	Fibre % cane	-

D	Roller diameter	m
L	Roller length	m
q_{762}	Fibre loading for a 762 mm roller	kg/m²
φ	Fibre index at the delivery opening	kg/m³
λ	Lift / working delivery opening	-
α	Top roller angle (between the two openings)	rad
k_d	Corrections to the delivery setting (wear, etc.)	m
m	Feed / delivery working ratio	-
k_f	Corrections to the feed setting	m
q	Fibre loading for this diameter	kg/m²
n	Roller speed	1/s
e_A	Working delivery opening	m
Δe	Opening gained by the lift	m
s_0	Empty delivery setting	m
E_A	Working feed opening	m
E_0	Empty feed setting	m

Method and standards

Hugot's account of the Java method.

Assumptions and limits

- Vertical housings; table values for the mill position. For inclined housings correct the openings with the mill inclined housing calculator.
- A note compares the roller speed with Hugot's maximal speed 10.5/(D + 0.73) rpm.

References

- Hugot
- Handbook of Cane Sugar Engineering
- 3rd ed. (Elsevier, 1986)
- ch. 13
- Java method
- pp. 201–204 (example of 15 rollers 813 × 1675 mm at 120 t/h)

Report details

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Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

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