Mill Fibre Loading and Capacity Ratio (Hugot)

Fibre loading, specific fibre loading, Hugot's normal specific loading and the capacity ratio of a mill (eqns 12.11–12.14), showing how hard the mill is worked.

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Crushing rate	130.00	t/h
Fibre % cane	12.500	%
Roller speed	4.9001	rpm
Roller diameter	0.81200	m
Roller length	1.6760	m
Cane preparation	Two knife sets and a shredder (1.22)	
Total rollers in the tandem	15.000	

Calculated results

Parameter	Value	Unit
Fibre loading	12.928	kg/m²
Specific fibre loading q/D	15.921	kg/m³
Normal specific fibre loading (eqn 12.12)	17.172	kg/m³
Capacity ratio τ/τ₀	0.92712	
Peripheral speed	12.500	m/min

Notes for this case

- θ below 1: the mill works under its normal capacity; above 1: overloaded, with extraction falling.

Formula and method

$$q = \frac{Af}{\pi D n L}, \quad \tau = \frac{q}{D}, \quad \tau_0 = 4.774\,c\,(1 - 0.06\,nD)\sqrt{N}, \quad \theta = \frac{\tau}{\tau_0}$$

Variables

A	Crushing rate	kg/s
f	Fibre % cane	-
n	Roller speed	1/s
D	Roller diameter	m
L	Roller length	m
c	Cane preparation	-
N	Total rollers in the tandem	-
q	Fibre loading	kg/m²
τ	Specific fibre loading q/D	kg/m³
τ_0	Normal specific fibre loading (eqn 12.12)	kg/m³
θ	Capacity ratio τ/τ₀	-
v	Peripheral speed	m/s

Method and standards

Continuity of fibre through the roller surface and Hugot's normal loading.

Assumptions and limits

- 3-roller mills at normal settings.
- The speed term (1 − 0.06 n D) takes n in rpm.

References

• Hugot
• Handbook of Cane Sugar Engineering
• 3rd ed. (Elsevier, 1986)
• ch. 12
• eqns 12.11–12.14
• pp. 195–197; worked example p. 311

Report details

Report reference	FCC-X3RE-8YAA (the same inputs always give the same reference)
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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-fibre-loading

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.