# Milling Tandem Capacity (Hugot's Formula)

Crushing capacity of a milling tandem from roller size and speed, number of rollers, fibre and cane preparation, by Hugot eqn 12.6 with his Table 12.1 coefficients.

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

## Input parameters

Unit system: SI

| Parameter | Value | Unit |
|---|---|---|
| Cane preparation | Two knife sets and a shredder (1.22) | |
| Roller speed | 5.0000 | rpm |
| Roller diameter | 0.91400 | m |
| Roller length | 1.8290 | m |
| Total rollers in the tandem (crusher rollers included) | 15.000 | |
| Fibre % cane | 14.500 | % |
| Top roller arcing | Arcing fitted (normal) | |

## Calculated results

| Parameter | Value | Unit |
|---|---|---|
| Preparation coefficient | 1.2200 | |
| Crushing capacity | 162.62 | t/h |
| Daily capacity with 1 % stops (23.75 A) | 3,862.2 | t/d |
| Fibre rate | 23.580 | t/h |

**Notes for this case**

- Hugot's formula is for 3-roller mills at normal settings and pressures; take it as the capacity the tandem handles without strain.

## Formula and method

$$A = \frac{0.9\,c\,n\,(1 - 0.06\,n D)\,L D^2 \sqrt{N}}{f}\,k_a \quad [\mathrm{t/h};\ n \text{ rpm};\ L, D \text{ m};\ f \text{ as a fraction}]$$

### Variables

| | | |
|---|---|---|
| $c$ | Cane preparation | - |
| $n$ | Roller speed | 1/s |
| $D$ | Roller diameter | m |
| $L$ | Roller length | m |
| $N$ | Total rollers in the tandem (crusher rollers included) | - |
| $f$ | Fibre % cane | - |
| $\mathrm{arcing}$ | Top roller arcing | - |
| $A$ | Crushing capacity | kg/s |
| $A_d$ | Daily capacity with 1 % stops (23.75 A) | kg/s |
| $Af$ | Fibre rate | kg/s |
| $k_a$ | Arcing factor (1 with arcing, 0.95 without) | - |

### Method and standards

Hugot's empirical capacity formula, eqn 12.6, with the fibre coefficients of Table 12.1 (Handbook of Cane Sugar Engineering, 3rd ed., pp. 190–191). The formula assumes the rollers are regularly arced; where they are not, Hugot (p. 191) applies a coefficient of 0.95

(k_a).

### Assumptions and limits

- Hugot's formula; normal settings and imbibition.
- f is fibre per unit cane as a fraction (0.145, not 14.5); entering a percentage number would give a capacity 100 times too small. The page takes it in % and converts.

### References

- Hugot
- Handbook of Cane Sugar Engineering
- 3rd ed. (Elsevier, 1986)
- ch. 12
- eqn 12.6 and Table 12.1
- pp. 186–191

## Report details

| | |
|---|---|
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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-tandem-capacity

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.