Mill Inclined Housings: Opening Change with Lift (Hugot)

How the feed and delivery openings change when the top roller lifts in inclined mill housings, and the ratio μ between them (Hugot eqns 13.9–13.10).

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Top roller angle (between feed and delivery roller centres)	67.000	°
Inclination of the housings from the vertical (towards the feed side)	15.000	°
Lift of the top roller	10.000	mm

Calculated results

Parameter	Value	Unit
Feed / delivery opening change ratio	0.69873	
Feed opening increase	6.6262	mm
Delivery opening increase	9.4832	mm
Increase of either opening with vertical housings	8.3389	mm

Notes for this case

• With inclined housings the delivery opens more than the feed as the roller lifts: Hugot's example (α/2 = 33.5°, β = 15°) gives μ = 0.7.

Formula and method

$$\mu = \frac{\cos(\alpha/2+\beta)}{\cos(\alpha/2-\beta)}, \quad \Delta E = \Delta h \cos(\alpha/2+\beta), \quad \Delta e = \Delta h \cos(\alpha/2-\beta)$$

Variables

α	Top roller angle (between feed and delivery roller centres)	rad
β	Inclination of the housings from the vertical	rad
Δh	Lift of the top roller	m
μ	Feed / delivery opening change ratio	-
ΔE	Feed opening increase	m
Δe	Delivery opening increase	m
Δe_v	Increase of either opening with vertical housings	m

Method and standards

Geometry of the lift along the inclined housing.

Assumptions and limits

- Small lifts; roller centres fixed otherwise.
- β is measured from the vertical towards the feed side, so that the delivery opens more than the feed; α/2 + β must stay below 90°.

References

• Hugot
• Handbook of Cane Sugar Engineering
• 3rd ed. (Elsevier, 1986)
• ch. 13
• eqns 13.9–13.10

- pp. 214–216

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-inclined-housing

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.