Extraction Gain from Cane Preparation (Hugot)

Extraction gained by knives and shredders for the number of rollers in the tandem (Hugot Table 20.1, eqn 6.2), and first-mill extraction from preparation index.

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Number of rollers in the tandem	15.000	
Preparation index	88.000	%

Calculated results

Parameter	Value	Unit
Gain from knives 3/(N − 6)	0.33333	%
Gain from a Searby-type shredder 7.5/(N − 8)	1.0714	%
Gain from a Maxwell-type shredder 2.5/(N − 8)	0.35714	%
Gain, high-power over normal shredder 10.7/(N − 8)	1.5286	%
First-mill extraction ≈ 1.02 I.P.	89.760	%

Notes for this case

- Gains are percentage points of extraction; they shrink as the tandem gets longer because later mills recover what poor preparation leaves.

Formula and method

$$\varepsilon_k = \frac{3}{N-6}\,\%, \quad \varepsilon_S = \frac{7.5}{N-8}\,\%, \quad \varepsilon_M = \frac{2.5}{N-8}\,\%, \quad \varepsilon_H = \frac{10.7}{N-8}\,\%, \quad e_1 \approx \min(1,\ 1.02\,I.P.)$$

Variables

N	Number of rollers in the tandem	-
$I.P.$	Preparation index	-
ε_k	Gain from knives 3/(N − 6)	-
ε_S	Gain from a Searby-type shredder 7.5/(N − 8)	-
ε_M	Gain from a Maxwell-type shredder 2.5/(N − 8)	-
ε_H	Gain, high-power over normal shredder 10.7/(N − 8)	-
e_1	First-mill extraction ≈ 1.02 I.P.	-

Method and standards

Hugot's empirical relations from mill results.

Assumptions and limits

- Empirical relations for conventional milling tandems, from Hugot's mill results; no validity range is given, and short tandems give large gains (7.5 points for a Searby shredder at 9 rollers), so treat the extremes as indicative.
- e_1 is the first-mill pol extraction, capped at 100 % above I.P. 0.98.

References

- Hugot
- Handbook of Cane Sugar Engineering
- 3rd ed. (Elsevier, 1986)
- ch. 20
- Table 20.1
- p. 321; ch. 6
- eqn 6.2 (Moor) and the Bingera relation e = 1.02 I.P.

- pp. 61–69

Report details

Report reference	FCC-6PG8-ADE2 (the same inputs always give the same reference)
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Method last reviewed	13 November 2026
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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/cane-preparation/cane-preparation-extraction-gain

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.