Share of Juice from the Feed Roller

Share of a mill's juice expressed at the feed roller from the brix of feed-roller, delivery-roller and mill juice (Hugot eqn 21.16), and the two juice flows.

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Brix of feed-roller juice	4.5000	%
Brix of delivery-roller juice	6.5000	%
Brix of the mill's juice	5.0000	%
Juice from the mill	60.000	t/h

Calculated results

Parameter	Value	Unit
Share of juice from the feed roller	75.000	%
Feed-roller juice	45.000	t/h
Delivery-roller juice	15.000	t/h

Notes for this case

- Hawaii practice: a last mill works well when 70–80 % of its juice comes from the feed roller; later mills about three-quarters.
- The feed and delivery brixes differ by only 2.0 points: an error of 0.1 brix in any reading moves the share by about 5 percentage points.

Formula and method

$$x = \frac{S - M}{S - E}$$

Variables

E	Brix of feed-roller juice	-
S	Brix of delivery-roller juice	-
M	Brix of the mill's juice	-
$\dot{m}_j$	Juice from the mill	kg/s
x	Share of juice from the feed roller	-
$\dot{m}_f$	Feed-roller juice	kg/s
$\dot{m}_d$	Delivery-roller juice	kg/s

Method and standards

Brix balance of the two roller juices.

Assumptions and limits

- Juice samples taken together under steady load.
- The share is very sensitive to brix errors when the feed and delivery brixes are close, as they often are at the last mills; a note gives the sensitivity, and another compares the share with Hawaii's 70–80 %.

References

- Hugot
- Handbook of Cane Sugar Engineering
- 3rd ed. (Elsevier, 1986)
- ch. 21
- eqn 21.16

- p. 337

Report details

Report reference	FCC-1F2X-6H1D (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/feed-roller-juice-share

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.