Sugar and Molasses Recoverable from Stock in Process

Sugar and molasses recoverable from up to four products in process (syrup, massecuites, molasses) by the SJM formula (Hugot 38.1–38.2, 39.1–39.3).

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Sugar purity	99.000	%
Final molasses purity	40.000	%
Dry solids of product 1 in stock	300.00	t
Purity of product 1	85.000	%
Dry solids of product 2 in stock	150.00	t
Purity of product 2	70.000	%
Dry solids of product 3 in stock	120.00	t
Purity of product 3	58.000	%
Dry solids of product 4 in stock	0	t
Purity of product 4	50.000	%

Calculated results

Parameter	Value	Unit
Sugar (dry solids) from product 1	228.81	t
Sugar (dry solids) from product 2	76.271	t
Sugar (dry solids) from product 3	36.610	t
Sugar (dry solids) from product 4	0	t
Sugar recoverable from stock	341.69	t
Molasses (dry solids) from stock	228.31	t
Sucrose recovery of product 1	88.833	%

Notes for this case

- Products less pure than the final molasses yield no sugar. Hugot's example: an 85-purity massecuite with 99 sugar and 40 molasses gives 76.27 % of its solids as sugar.

Formula and method

$$S_i = Q_i \frac{j_i - m}{s - m}, \quad \rho = \frac{s(j-m)}{j(s-m)}, \quad M = \sum Q_i - \sum S_i$$

Variables

s	Sugar purity	-
m	Final molasses purity	-
Q_1	Dry solids of product 1 in stock	kg
j_1	Purity of product 1	-
Q_2	Dry solids of product 2 in stock	kg
j_2	Purity of product 2	-
Q_3	Dry solids of product 3 in stock	kg

j_3	Purity of product 3	-
Q_4	Dry solids of product 4 in stock	kg
j_4	Purity of product 4	-
S_1	Sugar (dry solids) from product 1	kg
S_2	Sugar (dry solids) from product 2	kg
S_3	Sugar (dry solids) from product 3	kg
S_4	Sugar (dry solids) from product 4	kg
$\sum S$	Sugar recoverable from stock	kg
$\sum M$	Molasses (dry solids) from stock	kg
ρ_1	Sucrose recovery of product 1	-

Method and standards

Noël Deerr's SJM balance.

Assumptions and limits

- No further losses on the stock.
- Each product purity lies between the molasses and the sugar purity; a product purer than the sugar is rejected.

References

• Hugot
• Handbook of Cane Sugar Engineering
• 3rd ed. (Elsevier, 1986)
• ch. 38
• eqns 38.1–38.2
• p. 837; ch. 39
• eqns 39.1–39.3
• pp. 838–840

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/chemical-control/stock-in-process-sugar

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Reopens the calculator with the inputs of this report.