Raw Sugar Melter: Water or Sweet Water and Melt Purity

Water or sweet water to melt raw sugar to a target melt brix by a solids balance, the melt flow and the melt purity.

Method: Solids and pol balance

Input parameters

Unit system: SI

Parameter	Value	Unit
Raw sugar	20.000	t/h
Raw sugar brix (dry substance)	99.000	%
Raw sugar purity	98.500	%
Sweet water brix (0 for water)	10.000	%
Sweet water purity	95.000	%
Target melt brix	65.000	%

Calculated results

Parameter	Value	Unit
Sweet water or water	12.364	t/h
Melt	32.364	t/h
Melt purity	98.294	%

Formula and method

$$\dot{m}_w = \dot{m}_r \frac{Bx_r - Bx_m}{Bx_m - Bx_w}, \quad P_m = \frac{\dot{m}_r Bx_r P_r + \dot{m}_w Bx_w P_w}{\dot{m}_r Bx_r + \dot{m}_w Bx_w}$$

Variables

$\dot{m}_r$	Raw sugar	kg/s
Bx_r	Raw sugar brix (dry substance)	-
P_r	Raw sugar purity	-
Bx_w	Sweet water brix (0 for water)	-
P_w	Sweet water purity	-
Bx_m	Target melt brix	-
$\dot{m}_w$	Sweet water or water	kg/s
$\dot{m}_m$	Melt	kg/s
P_m	Melt purity	-

Method and standards

Solids and pol balance.

Assumptions and limits

- No losses.
- With no raw sugar the melt purity is undefined and is not shown.

References

- Solids and pol balance

Report details

Report reference	FCC-E19T-1TRD (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/refining/sugar-melt-balance

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.