Specific Heat of Massecuite, Molasses and Sugar

Specific heat of massecuite (Hugot eqns 33.1–33.2), of molasses by Janovsky (33.48) and of crystal sugar (36.3), from brix, crystal content, purity and temperature.

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Massecuite or molasses brix	95.000	%
Crystal % massecuite	45.000	%
Temperature	50.000	°C
True purity of the molasses	45.000	%
Dry substance of the molasses	82.000	%

Calculated results

Parameter	Value	Unit
Massecuite, 1 − 0.007B	1.4026	kJ/(kg·K)
Massecuite with crystal content	1.5020	kJ/(kg·K)
Molasses (Janovsky)	2.2848	kJ/(kg·K)
Crystal sugar 0.2775 + 0.000085t	1.1796	kJ/(kg·K)

Notes for this case

• The forms differ: for a massecuite use c_2, which allows for its crystal content; c_1 is the simpler brix-only form. Hugot uses about 0.44 kcal/(kg·°C) for C massecuite in crystalliser calculations (others quote 0.35–0.5), so plant data are worth having.

Formula and method

$$c_1 = 1 - 0.007B, \quad c_2 = 1 - 0.001\left(6 + \frac{\gamma}{60}\right)B, \quad c_M = 1 - [0.6 - 0.0018t + 0.0008(100 - P)]\frac{M}{100}, \quad c_s = 0.2775 + 0.000085t$$

Variables

B	Massecuite or molasses brix	-
γ	Crystal % massecuite	-
t	Temperature	K
P	True purity of the molasses	-
M	Dry substance of the molasses	-
c_1	Massecuite, 1 − 0.007B	J/(kg·K)
c_2	Massecuite with crystal content	J/(kg·K)
c_M	Molasses (Janovsky)	J/(kg·K)
c_s	Crystal sugar 0.2775 + 0.000085t	J/(kg·K)

Method and standards

Formulae as given by Hugot (kcal/(kg·°C); B, γ, P, M in %; t in °C).

Assumptions and limits

- Cane sugar products. The source gives no validity ranges for these empirical forms, and they can differ noticeably (for a C massecuite c_1 and c_2 give about 0.34–0.36 kcal/(kg·°C) against the 0.44 Hugot uses in crystalliser work). Prefer c_2 for massecuites and plant data where available.

References

• Hugot
• Handbook of Cane Sugar Engineering

- 3rd ed. (Elsevier, 1986)
- ch. 33
- eqns 33.1–33.2 and 33.48; ch. 36
- eqn 36.3

Report details

Report reference	FCC-QDVC-XWNW (the same inputs always give the same reference)
Generated	17 November 2026, 19:45 UTC
Calculator	Specific Heat of Massecuite, Molasses and Sugar
Method last reviewed	13 November 2026
Software release	FireCAD Calc, release of 17 November 2026
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/pan-boiling/massecuite-specific-heat

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.