Specific Heat of Cane Juice and Syrup

Specific heat of cane juice, syrup or molasses from brix, temperature and purity by Gucker and Ayres (Hugot eqn 30.2), and by Hugot's simple form 1 − 0.006B.

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Brix	16.000	%
Temperature	70.000	°C
Purity	85.000	%

Calculated results

Parameter	Value	Unit
Gucker and Ayres	3.8612	kJ/(kg·K)
Simple form 1 − 0.006B	3.7849	kJ/(kg·K)

Notes for this case

- For juices the two forms agree closely; the simple form is the one Hugot uses for juice heaters.

Formula and method

$$c_{GA} = 1 - [0.6 - 0.0018t + 0.0008(100 - P)]\frac{B}{100}, \quad c_s = 1 - 0.006B \; [\mathrm{kcal/(kg\,^\circ C)};\; B, P\,\%;\; t\;^\circ C]$$

Variables

B	Brix	-
t	Temperature	K
P	Purity	-
c_{GA}	Gucker and Ayres	J/(kg·K)
c_s	Simple form 1 − 0.006B	J/(kg·K)

Method and standards

Empirical formulae cited by Hugot.

Assumptions and limits

- Cane products; empirical fits. The source gives no validity ranges for brix, temperature or purity; treat results near the ends of the input ranges with care.
- The simple form is for juices: above about 30 brix use the Gucker and Ayres value (a note says so).

References

- Hugot
- Handbook of Cane Sugar Engineering
- 3rd ed. (Elsevier, 1986)
- ch. 30
- eqns 30.1–30.2 (Gucker and Ayres)
- p. 449

Report details

Report reference	FCC-3VGA-BQW4 (the same inputs always give the same reference)
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Calculator	Specific Heat of Cane Juice and Syrup
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/clarification/juice-specific-heat

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.