Bagasse Calorific Value from Moisture, Ash and Brix

Gross and net calorific value of bagasse from its moisture, ash and brix with the sugar-industry equations based on 19 605 kJ/kg for dry ash-free bagasse.

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Moisture % bagasse	50.000	%
Ash % bagasse	2.5000	%
Brix % bagasse	2.0000	%

Calculated results

Parameter	Value	Unit
Gross calorific value, as fired	9,250.1	kJ/kg
Net calorific value, as fired	7,375.0	kJ/kg

Notes for this case

- Near 50 % moisture each point of moisture costs nearly 3 % of the net value: bagasse moisture is the boiler's first variable.

Formula and method

$$GCV = 19605 - 196.05\,W - 196.05\,A - 31.14\,B \ \text{kJ/kg}$$

$$NCV = 18309 - 207.63\,W - 196.09\,A - 31.14\,B$$

Variables

W	Moisture % bagasse	-
A	Ash % bagasse	-
B	Brix % bagasse	-
GCV	Gross calorific value, as fired	J/kg
NCV	Net calorific value, as fired	J/kg

Method and standards

The net value is the South African formula printed in Hugot, Handbook of Cane Sugar Engineering, 3rd ed. (1986), p. 923 (B brix, W moisture, A ash, all % bagasse). The gross value takes the dry ash-free gross value of 19 605 kJ/kg in proportion to the combustible share, 19 605 (1 − W/100 − A/100), with the same brix term; Hugot gives other gross forms on pp. 922–923, for example 4600 − 12 s − 46 w kcal/kg (s sucrose, w moisture, % bagasse).

Assumptions and limits

- Cane bagasse; W, A, B in % of bagasse.
- Very wet or ashy bagasse gives a zero or negative NCV, which is not shown; a non-positive GCV stops the page.
- The net formula is used as printed. The gross formula is the dry ash-free gross value scaled by the combustible share, not a printed equation.

References

• Hugot
• Handbook of Cane Sugar Engineering
• 3rd ed. (1986)
• p. 923: South African NCV = 18 309 − 31.14 B − 207.63 W − 196.09 A kJ/kg; GCV on the same basis from the dry ash-free gross value 19 605 kJ/kg

Report details

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Release checks	3 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/steam-power/bagasse-calorific-value

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.