Ethanol from Cane Juice, Syrup or B-Heavy Molasses

Ethanol per tonne of juice, syrup or B-heavy molasses from its sucrose and reducing sugars, with fermentation and distillation efficiencies.

Method: Inversion $C_{12}H_{22}O_{11} + H_2O \rightarrow 2\ C_6H_{12}O_6$ (×1.0526) and Gay-Lussac stoichiometry $C_6H_{12}O_6 \rightarrow 2\ C_2H_5OH + 2\ CO_2$ with IUPAC atomic masses; ethanol density 789.24 kg/m³ at 20 °C (OIML R 22)

Input parameters

Unit system: SI

Parameter	Value	Unit
Sucrose % feed	13.000	%
Reducing sugars % feed	0.60000	%
Fermentation efficiency	90.000	%
Distillation efficiency	98.500	%
Ethanol density at 20 °C	789.24	kg/m³

Calculated results

Parameter	Value	Unit
Fermentable hexose % feed	14.284	%
Ethanol per tonne of feed	82.057	L/t
Ethanol per tonne of sucrose diverted	604.69	L/t

Formula and method

$$H = S\frac{2M_{C_6H_{12}O_6}}{M_{C_{12}H_{22}O_{11}}} + RS, \quad y = H\frac{2M_{EtOH}}{M_{C_6H_{12}O_6}}\frac{\eta_f\eta_d}{\rho_e}$$

Variables

S	Sucrose % feed	-
RS	Reducing sugars % feed	-
η_f	Fermentation efficiency	-
η_d	Distillation efficiency	-
ρ_e	Ethanol density at 20 °C	kg/m³
H	Fermentable hexose % feed	-
y	Ethanol per tonne of feed	m³/kg
y_S	Ethanol per tonne of sucrose diverted	m³/kg

Method and standards

Stoichiometry.

Assumptions and limits

- All sugars fermentable: the reducing sugars entered are taken as fermentable hexose. B-heavy molasses carries some unfermentable reducing substances; deduct them from RS, or the yield is overstated.

References

• Inversion $C_{12}H_{22}O_{11} + H_2O \rightarrow 2\ C_6H_{12}O_6$ (×1.0526) and Gay-Lussac stoichiometry $C_6H_{12}O_6 \rightarrow 2\ C_2H_5OH + 2\ CO_2$ with IUPAC atomic masses; ethanol density 789.24 kg/m³ at 20 °C (OIML R 22)

Report details

Report reference	FCC-9TPQ-51RW (the same inputs always give the same reference)
Generated	17 November 2026, 19:49 UTC
Calculator	Ethanol from Cane Juice, Syrup or B-Heavy Molasses
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/ethanol/juice-syrup-ethanol-yield

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.