Ethanol Yield from Molasses (TRS Basis)

Ethanol in litres per tonne of molasses and per day from fermentable sugars (TRS as invert), fermentation and distillation efficiencies.

Method: 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
Fermentable sugars (TRS as invert) % molasses	48.000	%
Fermentation efficiency	90.000	%
Distillation efficiency	98.500	%
Molasses processed	400.00	t/d
Ethanol density at 20 °C	789.24	kg/m³

Calculated results

Parameter	Value	Unit
Ethanol per tonne of molasses	275.74	L/t
Theoretical (100 % efficiencies)	311.04	L/t
Ethanol per day (absolute)	110.30	kL/d

Notes for this case

- Enter the fermentable sugars: total reducing sugars include unfermentable reducing substances, so using total TRS overestimates the yield.

Formula and method

$$y = TRS \frac{2M_{EtOH}}{M_{C_6H_{12}O_6}} \frac{\eta_f \eta_d}{\rho_e}$$

Variables

TRS	Fermentable sugars (TRS as invert) % molasses	-
η_f	Fermentation efficiency	-
η_d	Distillation efficiency	-
$\dot{m}_M$	Molasses processed	kg/s
ρ_e	Ethanol density at 20 °C	kg/m³
y	Ethanol per tonne of molasses	m³/kg
y_{th}	Theoretical (100 % efficiencies)	m³/kg
$\dot{V}_e$	Ethanol per day (absolute)	m³/s

Method and standards

Stoichiometry.

Assumptions and limits

- Fermentable sugars as invert. Total reducing sugars include unfermentable reducing substances; entering them instead overestimates the yield.

References

• 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-22W2-J1HN (the same inputs always give the same reference)
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Calculator	Ethanol Yield from Molasses (TRS Basis)
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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/molasses-ethanol-yield

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.