Pure Ethanol in a Weighed Mass of Spirit (Air Buoyancy)

Pure ethanol at 20 °C in a mass of spirit weighed in air of 1.2 kg/m³ with conventional weights, correcting for buoyancy, OIML R 22 Tables XII.

Method: OIML R 22 (1973); Alcoholometry; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Mass weighed in air (conventional)	100.00	kg
Strength entered as	% vol (by volume at 20 °C)	
Alcoholic strength	40.000	%
Temperature of the liquid R 22 formula range −20 to +40 °C.	20.000	°C

Calculated results

Parameter	Value	Unit
Density at t	948.05	kg/m³
True mass of spirit	100.11	kg
Mass of ethanol	33.337	kg
Pure ethanol at 20 °C	42.239	L

Formula and method

$$v = \frac{p\,m}{\rho_{20}(1)}\left[1 - 1.2\left(\frac{1}{8000} - \frac{1}{\rho_t}\right)\right]$$

Variables

m	Mass weighed in air (conventional)	kg
basis	Strength entered as	-
s	Alcoholic strength	-
t	Temperature of the liquid	K
ρ_t	Density at t	kg/m³
m_t	True mass of spirit	kg
m_e	Mass of ethanol	kg
v	Pure ethanol at 20 °C	m³
$1.2, 8000$	Air and conventional weight densities	kg/m³

Method and standards

R 22 Annex I formula for Tables XII.

Assumptions and limits

- Air 1.2 kg/m³; conventional weights.

References

- OIML R 22 (1973)
- Alcoholometry
- and International Alcoholometric Tables (1975)
- Annex I
- Tables XIIa and XIIb
- OIML R 33
- conventional value of the result of weighing in air (weights of 8 000 kg/m³)

Report details

Report reference	FCC-34H3-HBRW (the same inputs always give the same reference)
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Calculator	Pure Ethanol in a Weighed Mass of Spirit (Air Buoyancy)
Method last reviewed	13 November 2026
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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/alcoholometry/ethanol-in-weighed-mass-oiml

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.