Glass Alcoholometer Reading at t → True Strength

True alcoholic strength at 20 °C from the reading of a soda-lime glass alcoholometer (% vol or % mass) taken at another temperature, OIML R 22 Tables VIII.

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Alcoholometer graduated in	% vol	
Reading of the alcoholometer	42.000	%
Temperature of the liquid R 22 formula range −20 to +40 °C.	20.000	°C
Cubical (volume) expansion of the glass, about 3 × linear R 22: soda-lime glass 25 × 10^{-6} /°C, the cubical (volume) coefficient, not the linear one (about a third of it).	25.000	µm/(m·K)

Calculated results

Parameter	Value	Unit
Density corresponding to the reading	944.76	kg/m³
True density at t	944.76	kg/m³
Strength by mass	35.086	%
Strength by volume at 20 °C	42.000	%

Notes for this case

- The reading is also affected by surface tension at temperatures far from 20 °C: see the surface-tension correction.

Formula and method

The formula is shown on the calculator page: https://calc.firecad.com/sugar-ethanol/alcoholometry/alcoholometer-temperature-correction

Variables

scale	Alcoholometer graduated in	-
r	Reading of the alcoholometer	-
t	Temperature of the liquid	K
a	Cubical (volume) expansion of the glass, about 3 × linear	1/K
\rho'_{20}	Density corresponding to the reading	kg/m³
ρ_t	True density at t	kg/m³
p	Strength by mass	-
q	Strength by volume at 20 °C	-

Method and standards

R 22 Annex I method for Tables VIII.

Assumptions and limits

- Instrument graduated at 20 °C.
- No surface-tension correction.

References

- OIML R 22 (1973)
- Alcoholometry
- and International Alcoholometric Tables (1975)
- Annex I
- Tables VIIIa and VIIIb

Report details

Report reference	FCC-9QJF-JZ9P (the same inputs always give the same reference)
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Calculator	Glass Alcoholometer Reading at t → True Strength
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/alcoholometry/alcoholometer-temperature-correction

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.