Spirit Blending with True Contraction (OIML)

Strength and volume of a blend of two spirits given in % vol at 20 °C, by mass balance with OIML R 22 densities, so the volume contraction is included.

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Spirit 1 volume at 20 °C	1,000.0	L
Spirit 1 strength	96.000	%
Spirit 2 volume at 20 °C	1,500.0	L
Spirit 2 strength	10.000	%

Calculated results

Parameter	Value	Unit
Blend volume at 20 °C	2,434.3	L
Blend strength by volume	45.599	%
Blend strength by mass	38.348	%
Contraction	65.714	L

Notes for this case

- Absolute alcohol is conserved: V1 q1 + V2 q2 = Vm qm.

Formula and method

$$m_i = V_i\,\rho_{20}(p_i), \quad p_m = \frac{\sum m_i p_i}{\sum m_i}, \quad V_m = \frac{\sum m_i}{\rho_{20}(p_m)}$$

Variables

V_1	Spirit 1 volume at 20 °C	m³
q_1	Spirit 1 strength	-
V_2	Spirit 2 volume at 20 °C	m³
q_2	Spirit 2 strength	-
V_m	Blend volume at 20 °C	m³
q_m	Blend strength by volume	-
p_m	Blend strength by mass	-
$V_1 + V_2 - V_m$	Contraction	m³

Method and standards

Mass balance with R 22 densities.

Assumptions and limits

- Volumes at 20 °C.

References

- OIML R 22 (1973)
- Alcoholometry
- and International Alcoholometric Tables (1975): formula of Wagenbreth and Blanke
- pp. 12–13

Report details

Report reference	FCC-24G1-5WJA (the same inputs always give the same reference)
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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/spirit-blending-with-contraction

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.