Liquid Mixture Viscosity (Grunberg–Nissan)

Viscosity of a binary liquid mixture from pure-component viscosities and mole fractions by the Grunberg–Nissan equation with interaction parameter G_{12}.

Method: Perry's Chemical Engineers' Handbook; 9th ed. (McGraw-Hill, 2019); ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Mole fraction of liquid 1	50.000	%
Viscosity of liquid 1	0.60000	cP
Viscosity of liquid 2	1.2000	cP
Interaction parameter (0 = ideal)	0	

Calculated results

Parameter	Value	Unit
Mixture viscosity	0.84853	cP
Viscosity with G_{12} = 0 (log mean)	0.84853	cP

Formula and method

$$\ln \mu_m = x_1 \ln \mu_1 + x_2 \ln \mu_2 + x_1 x_2 G_{12}$$

Variables

x_1	Mole fraction of liquid 1	-
μ_1	Viscosity of liquid 1	Pa·s
μ_2	Viscosity of liquid 2	Pa·s
G_{12}	Interaction parameter (0 = ideal)	-
μ_m	Mixture viscosity	Pa·s
μ_{ideal}	Viscosity with G_{12} = 0 (log mean)	Pa·s

Method and standards

Grunberg–Nissan equation.

Assumptions and limits

- Binary; same temperature for all viscosities.

References

- Perry's Chemical Engineers' Handbook
- 9th ed. (McGraw-Hill, 2019)
- sec. 2 (transport properties): Grunberg–Nissan equation

Report details

Report reference	FCC-6XEJ-1D2G (the same inputs always give the same reference)
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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/chemical/unit-operations/liquid-mixture-viscosity-grunberg-nissan

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.