Dynamic and Kinematic Viscosity Conversion

Convert between dynamic viscosity (cP, Pa·s) and kinematic viscosity (cSt, mm²/s) with the fluid density, as for oils, fuels and process liquids.

Method: Definition ν = μ/ρ

Input parameters

Unit system: SI

Parameter	Value	Unit
Value known	Kinematic viscosity	
Kinematic viscosity	4.6000e-05	m²/s
Dynamic viscosity	0.040000	Pa·s
Density at the same temperature	870.00	kg/m³

Calculated results

Parameter	Value	Unit
Kinematic viscosity	4.6000e-05	m²/s
Dynamic viscosity	0.040020	Pa·s

Formula and method

$$\nu = \frac{\mu}{\rho}, \quad \mu\,[\mathrm{cP}] = \nu\,[\mathrm{cSt}] \times \rho\,[\mathrm{g/cm^3}]$$

Variables

given	Value known	-
ν_{in}	Kinematic viscosity	m²/s
μ_{in}	Dynamic viscosity	Pa·s
ρ	Density at the same temperature	kg/m³
ν	Kinematic viscosity	m²/s
μ	Dynamic viscosity	Pa·s

Method and standards

Definition.

Assumptions and limits

- Newtonian fluid.

References

- Definition ν = μ/ρ

Report details

Report reference	FCC-Y709-6CE6 (the same inputs always give the same reference)
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Calculator	Dynamic and Kinematic Viscosity Conversion
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Software release	FireCAD Calc, release of 17 November 2026
Release checks	3 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/mechanical/fluid-mechanics/viscosity-dynamic-kinematic

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.