Tyre Hydroplaning Speed (Horne)

Speed above which a tyre can fully hydroplane on flooded pavement by Horne's inflation-pressure rule, and the margin of a vehicle speed against it.

Method: Horne's dynamic hydroplaning speed

Input parameters

Unit system: SI

Parameter	Value	Unit
Tyre inflation pressure (gauge)	230.00	kPa
Vehicle speed	100.00	km/h

Calculated results

Parameter	Value	Unit
Hydroplaning speed	96.204	km/h
Speed relative to hydroplaning speed	103.95	%

Notes for this case

• Horne: V_p = 10.35√p (mph, psi), which is about 6.34√p (km/h, kPa). It holds for water deeper than the tread can drain (roughly above 2.5–5 mm) and smooth or worn tyres; good tread depth and narrower tyres raise the speed, and partial loss of grip starts well below V_p.

Formula and method

$$V_p = 10.35\sqrt{p_{psi}}\ \text{mph} \approx 6.34\sqrt{p_{kPa}}\ \text{km/h}$$

Variables

p	Tyre inflation pressure (gauge)	Pa
v	Vehicle speed	m/s
V_p	Hydroplaning speed	m/s
v/V_p	Speed relative to hydroplaning speed	-

Method and standards

Hydroplaning.

Assumptions and limits

- Flooded pavement deeper than tread drainage; pneumatic tyres.

References

Horne's dynamic hydroplaning speed

Report details

Report reference	FCC-F6V4-0H1D (the same inputs always give the same reference)
Generated	23 November 2026, 17:51 UTC
Calculator	Tyre Hydroplaning Speed (Horne)
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Software release	FireCAD Calc, release of 22 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/automotive/tyres-wheels/tyre-hydroplaning-speed

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.