Rollover Threshold: Static Stability Factor

Static stability factor and rollover threshold lateral acceleration of a vehicle from track width and CG height, with rollover and sliding speeds on a curve.

Method: Rigid-vehicle quasi-static rollover

Input parameters

Unit system: SI

Parameter	Value	Unit
Track width	1,550.0	mm
Centre-of-gravity height	700.00	mm
Curve radius	50.000	m
Tyre-road friction coefficient	0.90000	

Calculated results

Parameter	Value	Unit
Static stability factor T/2h	1.1071	
Rollover threshold	1.1071	g
Speed to roll on the curve	83.878	km/h
Speed to slide on the curve	75.626	km/h

Notes for this case

- Rigid-vehicle threshold a = gT/(2h). Body roll and tyre deflection move the CG outwards, so real thresholds are 10–25 % lower; a kerb strike or soft ground trips a vehicle far below it.
- SSF exceeds μ: the tyres slide before the vehicle tips on a flat road.

Formula and method

$$SSF = \frac{T}{2h}, \quad a_{roll} = g \cdot SSF, \quad v_{roll} = \sqrt{a_{roll} R}$$

Variables

T	Track width	m
h	Centre-of-gravity height	m
R	Curve radius	m
μ	Tyre-road friction coefficient	-
SSF	Static stability factor T/2h	-
a_{roll}	Rollover threshold	m/s²
v_{roll}	Speed to roll on the curve	m/s
v_{slide}	Speed to slide on the curve	m/s

Method and standards

Rollover threshold.

Assumptions and limits

- Rigid vehicle; flat road; steady turn.

References

Rigid-vehicle quasi-static rollover

Report details

Report reference	FCC-X70G-P2SP (the same inputs always give the same reference)
Generated	23 November 2026, 18:00 UTC
Calculator	Rollover Threshold: Static Stability Factor
Method last reviewed	17 November 2026
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/vehicle-dynamics/rollover-static-stability-factor

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.