Parachute Descent Rate and Required Canopy Size

Steady descent rate of a payload under a parachute from its mass, canopy diameter and drag coefficient at an altitude, and the canopy size for a target descent rate.

Method: Steady parachute descent from the drag equation

Input parameters

Unit system: SI

Parameter	Value	Unit
Suspended mass	2.5000	kg
Nominal canopy diameter	1.2000	m
Drag coefficient on the nominal area (round 0.75–0.9, cross 0.6–0.85)	0.80000	
Altitude (ISA)	500.00	m
Target descent rate	5.0000	m/s

Calculated results

Parameter	Value	Unit
Descent rate	6.8138	m/s
Descent rate at sea level	6.6513	m/s
Kinetic energy at landing	58.035	J
Equivalent drop height v²/2g	2.3672	m
Canopy diameter for the target rate	1.6353	m

Notes for this case

• Steady descent: weight balanced by drag ½ρv²C_D S on the nominal canopy area. Opening shock, oscillation and wind drift are not included; the payload's own drag is neglected.

Formula and method

$$v_d = \sqrt{\frac{2mg}{\rho C_D S_0}}, \quad S_0 = \frac{\pi D_0^2}{4}, \quad D_{req} = \sqrt{\frac{8mg}{\pi \rho C_D v_{target}^2}}$$

Variables

m	Suspended mass	kg
D_0	Nominal canopy diameter	m
C_D	Drag coefficient on the nominal area (round 0.75–0.9, cross 0.6–0.85)	-
h	Altitude (ISA)	m
v_{target}	Target descent rate	m/s
v_d	Descent rate	m/s
$v_{d,0}$	Descent rate at sea level	m/s
E_k	Kinetic energy at landing	J
h_{eq}	Equivalent drop height v²/2g	m
D_{req}	Canopy diameter for the target rate	m

Method and standards

Drag-weight balance.

Assumptions and limits

- Steady vertical descent, fully inflated canopy, still air.

References

Steady parachute descent from the drag equation

Report details

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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/aerospace/parachute-descent-rate

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.