Battery C-Rate: Current, Run Time and Energy

Current at a given C-rate, ideal run time, energy and power of a battery from its capacity and voltage, with the C-rate of a load current.

Method: C-rate definition and ideal capacity relations

Input parameters

Unit system: SI

Parameter	Value	Unit
Rated capacity	2,200.0	mAh
Nominal voltage	11.100	V
C-rate (multiples of capacity per hour)	25.000	
Load current to evaluate	15.000	A

Calculated results

Parameter	Value	Unit
Current at the C-rate	55.000	A
Ideal run time at that C-rate	2.4000	min
Stored energy	24.420	Wh
Power at the C-rate	610.50	W
C-rate of the load current	6.8182	
Ideal run time at the load current	8.8000	min

Notes for this case

• 1C discharges the rated capacity in one hour. Real run time is shorter at high rates (Peukert effect, voltage sag) and in the cold; LiPo packs should not be run below about 20 % charge.

Formula and method

$$I = C_{rate} \times C_{Ah}, \quad t = \frac{1}{C_{rate}}\ \mathrm{h}, \quad E = C_{Ah} U, \quad C_{load} = \frac{I_{load}}{C_{Ah}}$$

Variables

C	Rated capacity	C
U	Nominal voltage	V
C_{rate}	C-rate (multiples of capacity per hour)	-
I_{load}	Load current to evaluate	A
I	Current at the C-rate	A
t	Ideal run time at that C-rate	s
E	Stored energy	J
P	Power at the C-rate	W
C_{load}	C-rate of the load current	-
t_{load}	Ideal run time at the load current	s

Method and standards

Battery rate definitions.

Assumptions and limits

- Ideal capacity independent of rate.

References

C-rate definition and ideal capacity relations

Report details

Report reference	FCC-272N-1G8K (the same inputs always give the same reference)
Generated	23 November 2026, 17:34 UTC
Calculator	Battery C-Rate: Current, Run Time and Energy
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/electrical/electronics/battery-c-rate

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.