

Emergency Lighting Battery Calculator

Estimate emergency-lighting battery energy and amp-hour requirements from the connected load, required runtime, battery voltage, usable capacity, conversion efficiency, and reserve.

Generated October 10, 2026

<https://www.elecatrix.com/lighting/emergency-lighting-battery-calculator/>

Inputs

Input	Value	Unit
Emergency load	150	W
Runtime	1.5	hours
Battery voltage	12	V
Usable capacity	80	%
Efficiency	90	%
Reserve adder	10	%

Results

Result	Value	Unit
Load energy	225	Wh
Usable factor	0.72	x
Base battery energy	312.5	Wh
Required battery energy	343.75	Wh
Required battery capacity	28.6458	Ah

Calculation details

Detail	Value	Unit
Calculation basis	Required battery energy is emergency load times runtime, divided by usable capacity and efficiency, then adjusted by the entered reserve.	
Selection boundary	Emergency lighting battery estimate only; no code runtime approval, listing, charger, temperature, transfer, fixture, inspection, or code-compliance result is made.	

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Formulas

Load energy (Wh) = load watts x runtime (h)

Usable factor = (usable capacity (%) / 100) x (efficiency (%) / 100)

Base battery energy (Wh) = (load energy (Wh) / usable factor)

Required battery energy (Wh) = base battery energy x (1 + (reserve (%) / 100))

Required battery capacity (Ah) = (required battery energy (Wh) / battery voltage)

Warnings and limitations

This emergency lighting battery calculation is capacity arithmetic only. It does not approve emergency lighting code runtime, listed equipment, charging, transfer, temperature derating, inspection, or code compliance.