

Discover ways to extend battery life by following simple guidelines.

"What can I do to keep my batteries longer?" many people ask. As folks stay fit by refraining from smoking, lowering sugar intake and exercising, so also can battery life be extended. There are no hard numbers as to how effective good care is, but the proof is in examples where packs were issued as personal goods as opposed to stock items. Personal care almost always wins.

Table 1 summarizes how to prolong battery life through proper attention. Because of similarities within systems, the chemistries are limited to lead, nickel and lithium.

Battery Care	Lead acid: Flooded, sealed, gel, AGM, VRLA	Nickel-based: NiCd, NiMH	Lithium-ion: Cobalt, manganese, NMC, LFP
Best Way to Charge	Apply saturated charge to prevent sulfation; can remain on charge with correct float voltage.	Avoid getting battery too hot on charge. Do not leave battery in charger for more than a few days Subject to memory.	Partial and random charge is fine; does not need full charge; lower voltage limit preferred; keep battery cool.
Charge Methods	Constant voltage to 2.40–2.45/cell, float at 2.25–2.30V/cell. Battery should stay cool; no fast charge possible. Charge time 14–16h.	Constant current, NiCd/NiMH can be fast charged without stress; trickle charge at 0.05C. Slow charge = 14h Rapid charge = 3h* Fast charge = 1h* NiCd * Recommended	Constant current / constant voltage to 4.20V/cell; no trickle charge; battery can stay in charger. Rapid charge = 3h* Fast charge = 1h * Recommended
Discharge	Can endure high peak currents. Avoid full discharges. Charge after each use.	Do not over-discharge with a heavy load; cell reversal causes short. Avoid full discharges.	Prevent full discharge, apply some charge after a full discharge to keep the protection circuit alive.
How to Prolong Battery	Limit deep cycling; do not deep-cycle starter battery. Apply fully saturation charge. Avoid heat.	Discharge batteries that are in regular use (mainly NiCd) to 1V/cell every 1–3 months	Keep cool. Operate in mid SoC of 30–80%. Prevent ultra-fast charging and high loads (most Li-ion)
Transport	Flooded: Class 8 restrictions, provide "corrosive" label. Non-spillable: Class 8 exempt.	Prevent short by placing battery in clear plastic bag. See BU-704: How to Transport Batteries	Loose cell under Section II must be shipped at 30% state-of-charge or lower (Air Shipments). See BU-704a Shipping Lithium-based Batteries
Storage	Keep cells at >2.05V. Apply topping charge** every 6 months to prevent sulfation.	Store in cool place; NiCd stores for 5 years; prime before use	Store at 40-50% charge in cool place
Disposal	Toxic. Do not dispose. Electrolyte corrosive. Profitable to recycle.	NiCd: Do not dispose / toxic NiMH: May be disposed in low volume	Low toxicity. Can be disposed in low volume. Best to recycle.

Table 1: Do's and don'ts summary of how to use, maintain and dispose of batteries.

** Topping charge is applied on a battery that is in service or storage to maintain full charge and to prevent sulfation on lead acid batteries.

CAUTION: Under no circumstances should batteries be incinerated, as fire can cause an explosion. Wear approved gloves when touching electrolyte. On exposure to skin, flush with water immediately. If eye exposure occurs, flush with water for 15 minutes and consult a physician immediately.

Source: https://batteryuniversity.com/learn/article/do_and_dont_battery_table (Last updated 2018-04-10)