

Using & Charging Small Batteries

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Disposable Batteries (DBs)

Size	\$/battery (2003)	Volts (Nom)	Capacity (C) mAh	kWh per Battery	\$/kWh
N	\$1.05	1.5	650	0.0010	\$1,076.92
AAA	\$0.74	1.5	1000	0.0015	\$493.33
AA	\$0.74	1.5	2000	0.0030	\$246.67
C	\$1.32	1.5	8000	0.0090	\$146.67
D	\$1.32	1.5	12000	0.0180	\$73.33
9V	\$2.38	9.0	500	0.0045	\$528.89

Energy too expensive to meter !!!

NO JOKE! Electricity purchased in disposable batteries is likely the most expensive energy around. Even discount prices result in super-high energy cost. PV solar power usually costs \$0.20 - \$0.40/kWh. Local utility electricity costs only \$0.02 - 0.15/kWh. Payback @ 40th avoided DB for AC-charged D-size, Payback @ 70th avoided DB for PV-charged AA-size, (based on est'd least battery & charging equip't costs.)

Rechargeable NMH Batteries

(High Capacity' NiCads similar, w/ less power capacity but more ability to handle large loads)

Size	\$/battery (2003)	Cost same as how many DBs?	Output Volts For 75% of C	Right After Fully Charged (1)			Charging Volts		How Many MilliAmps For How Many Hours (3)				
				Volts (Max)	Mah (C)	kWh	Min	Max (2)	5 hr	10 hr	15 hr	24 hr	48 hr
N	\$7.41	7.1	1.2	1.4	380	0.0004	1.5	2.0	72	36	24	15	8
AAA	\$4.77	6.4	1.2	1.4	600	0.0007	1.5	2.0	120	60	40	25	13
AA	\$4.77	6.4	1.2	1.4	1600	0.0019	1.5	2.0	320	160	107	67	33
C	\$7.94	6.0	1.2	1.4	3000	0.0038	1.5	2.0	600	300	200	125	63
D	\$7.94	6.0	1.2	1.4	4500	0.0054	1.5	2.0	900	450	300	188	94
9V	\$12.71	5.3	7.2	8.4	150	0.0011	9.0	12.0	30	15	10	6	3

- (1) Fully-charged voltage & capacity depend on battery specs, charger and storage time after charge. Fully charged NMH batteries self-discharge 30+% per month (NiCads 20%). Best results are when discharge is shortly after charge. Specs shown in above tables based on published data in RADIO SHACK and other common catalogs. Specs vary for same-size NMH and NiCad batteries made by different manufacturers.
- (2) Apply maximum charging voltages only if batteries are regularly monitored & full-rate charging stopped when battery overheating occurs.
- (3) Charge rates expressed as full-charge capacity divided by charge hours. 5 hr values (also called "C/5") may exceed battery specs for 'fast recharge' even with charger using temperature-activated shut-off. For all recharge rates faster than 10 hrs (C/10), check battery specs and avoid exceeding "fast charge" rate. To avoid damaging batteries during charge, especially unfamiliar batteries, check their temperature. Batteries are usually okay if warm. If batteries get hot, discontinue charging, and reduce charge time and/or charge rate (ma) next time.

OVERCHARGING BATTERIES CAN CAUSE SEAL DAMAGE OR EXPLOSION ! DO NOT ALLOW BATTERIES TO CHARGE INDEFINITELY !