

Charging Lead/Acid Batteries

12 volt Side of Life part 1

<http://marxrv.com/12volt/12volt.htm>

12 volt Side of Life part 2

<http://marxrv.com/12volt/12volta.htm>

Some of the information is a little dated, but it is still pretty good.

Battery University <https://batteryuniversity.com/articles>

How does the Lead Acid Battery Work?

<https://batteryuniversity.com/article/bu-201-how-does-the-lead-acid-battery-work>

How do battery chargers work

<https://batteryuniversity.com/article/bu-401-how-do-battery-chargers-work>

How to Charge and When to Charge?

<https://batteryuniversity.com/article/bu-415-how-to-charge-and-when-to-charge>

"Static" State of Charge (SoC) voltage

Lead acid batteries have three basic voltage profiles. They are "charging", "discharging", and "static".

"Charging" voltages depend mostly on the charger. Voltage starts at the static voltage and raises slowly to the preset charging voltage. Typical charging voltages are 13.2, 13.6, or 14.4 volts.

"Discharging" voltage will always be lower than "static" voltage. The faster the discharge, the lower the voltage. Voltage will slowly raise to "static" level when discharge is stopped.

"Static" voltage can be used to monitor state of charge (SoC). It is when no charging or discharging has taken place for a while. Voltage will slowly stabilize while resting. Accurate static values can usually be made after 3 hours of rest.

Lead Acid Batteries after 3 hours rest

100% 12.7

90% 12.5

80% 12.42
 70% 12.32
 60% 12.2
 50% 12.06
 40% 11.9
 30% 11.75
 20% 11.58
 10% 11.31
 0% 10.5

Lead Acid Battery State of Charge

After 3 hour rest

State of Charge	12 Volt battery	Volts per Cell
100%	12.7	2.12
90%	12.5	2.08
80%	12.42	2.07
70%	12.32	2.05
60%	12.2	2.03
50%	12.06	2.01
40%	11.9	1.98
30%	11.75	1.96
20%	11.58	1.93
10%	11.31	1.89
0	10.5	1.75

Choosing An RV Battery <https://www.irv2.com/forums/downloads.php?do=file&id=231>

This is a good article, but its recommendations against “Marine Batteries” does not apply to “Marine AGM batteries”.

Battle Born Lithium https://www.solar-electric.com/lib/wind-sun/Battle_Born_Manual.pdf
<https://battlebornbatteries.com/charger-compatibility-table/>
<https://battlebornbatteries.com/systems/rv/towable/>

Lithium Battery Systems

<https://marinehowto.com/drop-in-lifepo4-be-an-educated-consumer/>

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[The 12volt Side of Life \(Part 1\)](#)

12 volt Side of Life part 2

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