

Sealed Lead-Acid Batteries

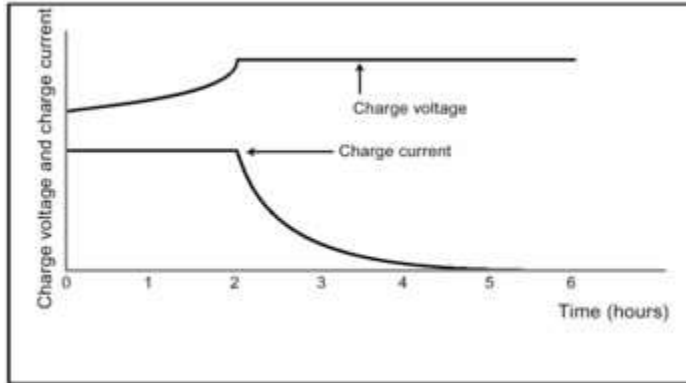
Low initial cost and easy maintenance are good reasons to choose Sealed lead acid (SLA) battery packs. Sealed lead acid has the lowest energy density of the rechargeable batteries. There are many instances, however, when sealed lead acid is an excellent choice. Sealed lead acid is a good choice when size and weight aren't critical factors and cost must be kept low. This chemistry is usually found in stationary applications like uninterruptible power supplies and emergency lighting. Because sealed lead acid is predictable and easy to maintain, it's a popular choice for medical applications.

There are many benefits to sealed lead acid. SLA isn't affected by the so called "memory effect" that nickel batteries suffer from, and SLA has the best charge retention of any rechargeable battery. With SLA, it's fairly easy to determine the remaining capacity based on open circuit voltage (OCV); it's only about 20% accurate though.

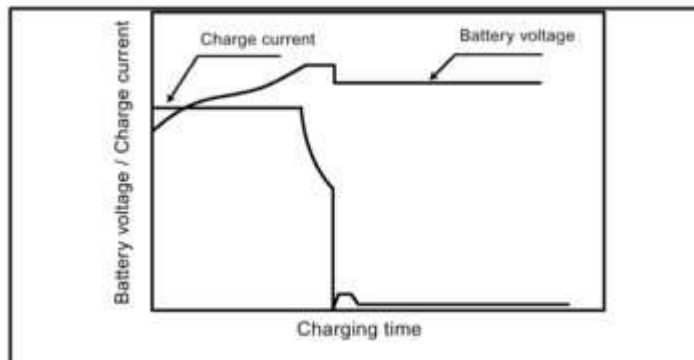
There are some down sides to SLA. Besides the size and weight disadvantage, SLA won't take a fast charge well, doesn't perform well at low temperatures. SLA loses its charge quickly if stored at higher temperatures.

The exceptions are "pure lead" batteries which are capable of fast charging and perform well at lower temperatures. Pure lead batteries also have much better charge retention and recovery characteristics after long periods of storage (one or two years).

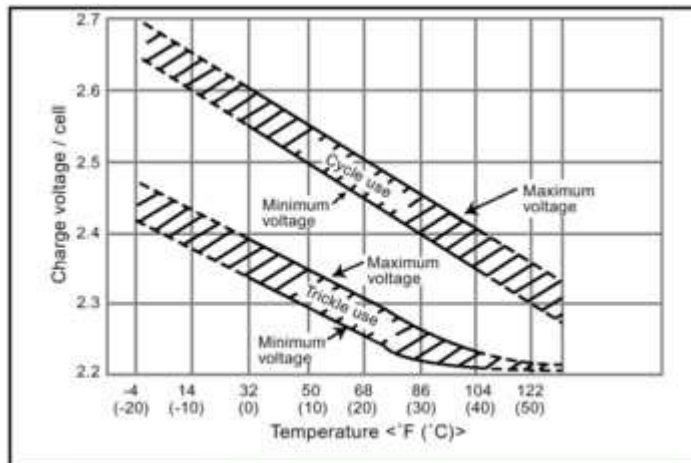
SLA batteries prefer a constant voltage charge. VRLA batteries can take a charge well from 7 hours at one-fourth the battery's capacity in input current, C/4, to 14 hours at C/10 or one-tenth the battery's rated capacity in input current. At these charge rates 2.45 volts per cell at 20° C is best. C/300 (capacity / 300) is a good trickle or float charge current with 2.35/cell at 20°C. Also, the charge voltage must be lowered for temperature above 20°C and raised for temperature lower than 20°C. (See Third Chart Down)



Constant Current/Constant Voltage Charge Characteristics

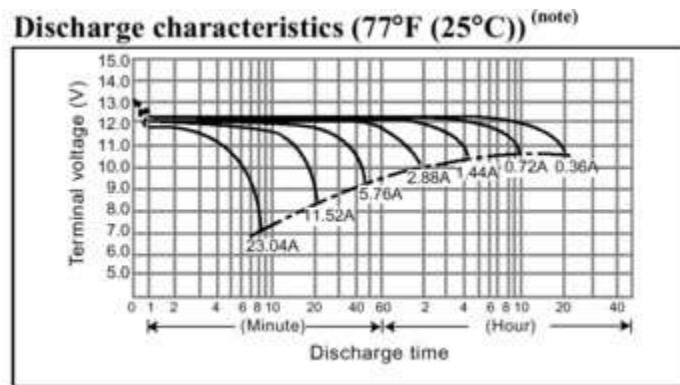


Charge Characteristics for a Two Stage Constant Voltage Charger



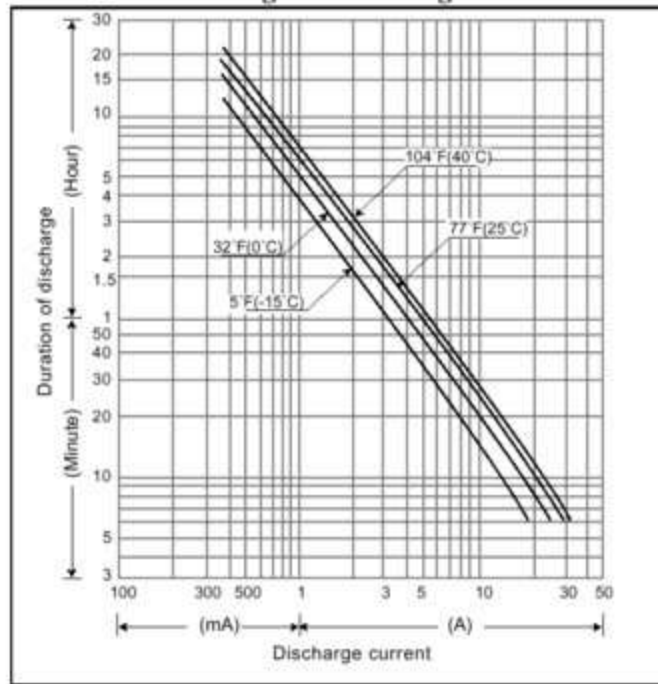
Charge Voltage Compensation for Various Temperatures

- Cell Voltage: 2.0V (nominal)
- Capacity: 500mAh to 100Ah or more
- Energy by Weight: 30 Watt Hour/Kilogram
- Energy by Volume: Watt Hour/cubic centimeter
- Cycle Life: 200-500 Cycles
- Self Discharge: 5%/month
- Temperature Range: -20° C to +60° C
- Preferred Charge Methods: Constant Voltage C/10 to C/4
- Applications: Communication equipment, Office equipment, Security systems, Small power tools, Toys, UPS systems, Communication equipment, Large power tools, Office equipment, Security systems UPS systems, Back-up for lighting equipment (used with solar cells), CATV, CVCF, Emergency lights, Engine starting (portable generator), PBX, Base stations, Large and small power tools and toys, Audio Communication equipment, Office equipment and VCRs



**Discharge Characteristics for a Typical 12 volt 7 Ampere Hour
VRLA Battery**

Duration of discharge vs. Discharge current ^(note)



**Discharge Characteristics for a Typical 12 volt 7 Ampere Hour
VRLA Battery**