Add: Floor 3, Building Evolution, Xingdong industry Park, NO.61, Liuxian 2nd Road, Baoan, Shenzhen, China.
Tel: 86-755-29123661 Email: sales@csbattery.cn

# Main problem affect battery performance and life

## ● Why must charge the battery during in stock?

Storage battery life will be affected by stock time and stock temperature:

The longer time the battery been stocked, the battery capacity will decrease, the higher temperature, the battery capacity will decrease more.
If battery storage long time, it will self discharge, self discharge is a kind of micro-current discharge, it will create tight lead sulfate crystals, after long time accumulate, will change to tight lead sulfate floors, the charge way of constant voltage and limit current can not change the tight lead sulfate floors to active material, finally lead the battery capacity can not be recovered.

For the battery long time in stock, The battery will self discharge 3% per month normally in 25degree, please according to below:
1. if the self discharged battery actual capacity above 80% marked capacity: no need to charge by extra.
2. if the self discharged battery actual capacity between 60%-80% marked capacity: please charge the battery before start use, so can recover its capacity.
3. If the self discharged battery actual capacity below 60% marked capacity: Even recharge can not recover the battery, so never put the battery in stock over 10months without charge.

In order to keep the battery always in good performance, to the battery which in stock, must charge and discharge at least once every 6 months, to revive the battery capacity, according to different storage temperature, the suggest supply charge time interval is as below:
1. If the battery stocked in temperature between 10-20degree, please charge and discharge at least once every 6months.
2. If the battery stocked in temperature between 20-30degree, please charge and discharge at least once every 3months.
3. If the battery stocked in temperature above 30degree, please change the storage place, this temperature will be badly affect on battery capacity and performance.

## ● Main Problem of will decrease battery life: Battery Negative Plates Sulfation

The main active material of the battery negative plate is the spongy lead, the negative plates has the following chemical reaction when the battery is charged: $PbSO4+ 2e = Pb + SO4$, menwhile, the positive plates come up oxidizing reaction: $PbSO4 + 2H2O = PbO2 + 4H+ + SO4- + 2e$.

The chemical reaction happens when discharging, its the inverse response of the reaction above, when the hopower of Valve Regulated Sealed lead acid battery becomes insufficient, there's PbSO4 on the battery lead plates, both negative and positive plates, long esxitence of PbSO4 will make itself loss active substance, then can't take part in the chemical reaction. This phenomenon is called: " Sulfation of active sustance", at the same time, Sulfation will decrease active substance, reduce the battery's effective capacity, also will influence the battery gas absorption capacity. After long time sulfation, the battery will lose efficacy.
Why will the suitation happen, mainly because of the reasons as below:
1) VRLA Battery stays long time in discharging condition, or can't be charged immediately after discharge, just

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lay aside and uncharged long time. Under this circumstances, Lead sulfate crystals in active sustances which didn't Subject to electrochemical reduction increase their quantity, These lead sulfate crystals are recrystallized to make the particles larger and produce irreversible lead sulfate.
2) Long-term lack of charge, which means the the float charge voltage of entire group of batteries stays Low than request long-time (print on battery), result to "Low batteries".
3) Deep discharge frequently ( battery voltage lower than 1.75-1.80v/per cell when discharge), there are frequent blackouts in remote areas, and the deep discharge of batteries makes the unreducible lead of sulfuric acid accumulated to a considerable amount in the active substance.

Therefore, in order to prevent the formation of negative sulfation, the battery must always be kept in a fully charged condition.

## ● Why VRLA battery will happen water loss?

Water loss is the main reason of vrla battery, it is related with its poor electrolyte liquid structure. The water loss of battery is the main reason to affect battery life, over-loss of water will lead the battery liquid decrease and battery capacity decrease.
Maintenance free battery is working in poor electrolyte liquid status, its electrolyte is completely stored in separators. Once water loss, the battery capacity will decrease, when the water loss reach to 25%, the battery life will be end. Of course, because of too high charge voltage, the electrolyte reaction increase, gas release speed become higher, water loss will happen for sure. And also if the battery work temperature increase, but the charge voltage is not been adjusted, will happen water loss, too.
Main reason of Battery capacity decrease is water loss. Once the battery met water loss, the battery positive/negative lead plates will not touch the separator and electrolyte is not enough to react, so the battery has no power out. Although storage battery adopts oxygen cycle technology, will minimum the water loss of electrolyte, however, waterloss caused by below reason cann't be avoided during use:
1. If the float voltage set is suitable for current battery (as different factory has different request), will occur big affect on battery life. When the float voltage a little high or the battery temperature increase, must immediately decrease the float voltage, otherwise, the battery float voltage over-high, so the over charge current will increase, then the oxygen recombination reaction efficiency will decrease, finally will happen water loss, and speed up the battery water loss progress.
2. High frequency use will speed up the corrosion of positive lead plates grid, the result of positive lead plates grid is that the lead in lead plates grid will change to lead dioxide, requested oxygen will only come from the water in the electrolyte, so will consume much water, too. Sometimes, because of the fault of vent valve, mass hydrogen and oxygen will release from battery, lead to the water loss.
3. The battery after water loss means had increased the concentration of sulfuric acid. Because this concentration increase, the sulfation will become very heavy, and lower the ability of positive lead plates oxygen cycle. So the sulfation of battery will heavy the water loss, and the water loss will heavy the sulfation in reverse.

## ● What causes the battery ballooning?

There are two kinds of battery ballooning, one is partial ballooning, the other is integral ballooning. The reasons are as follows:

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A. Partial ballooning

1, The micro short-circuit occurs inside the battery. In this kind of situation, the partial ballooning will happen during the charging process.

2, The electrolyte is not enough inside each cell. The partial ballooning will happen during the charging process.

B. Integral ballooning

1, the temperature influence :

a. The battery is charged under a high ambient temperature which is more than 50℃. The battery ballooning will happen during the constant current charging process.

b. The temperature coefficient compensation is not adopted during the stand-by charging process. The thermal runaway happens as the voltage can not alter according to the ambient temperature.

2, The outer short-circuit will cause the integral tympanites during the usage.

3, The battery is often over charged which causes serious water loss and thermal runaway.

Above is not only for our battery, but for all Chinese agm and gel battery, will avoid the problem and enhance the battery performance.

Please accordingly above.

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