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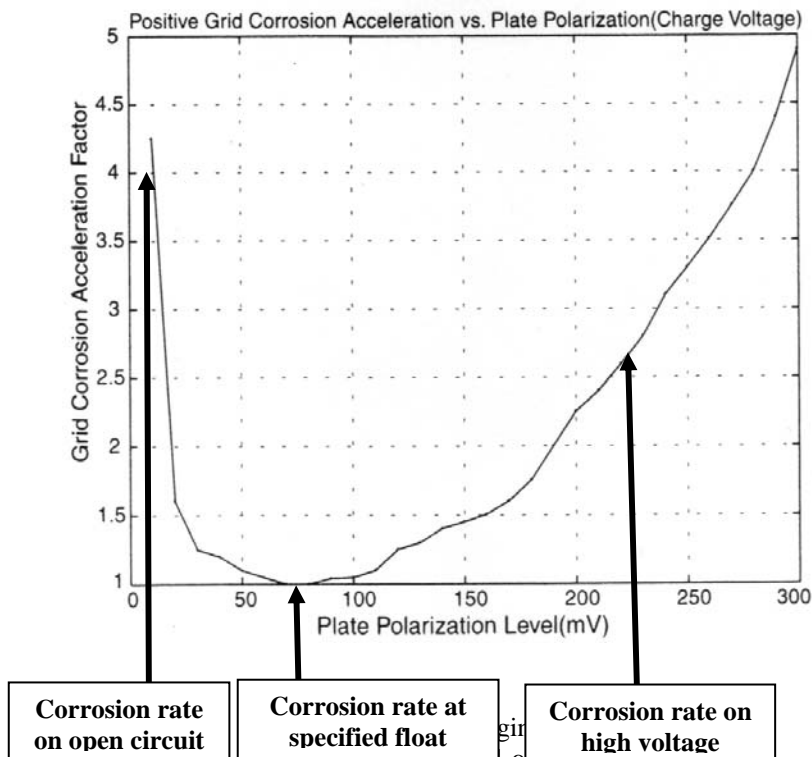
Intermittent Charging

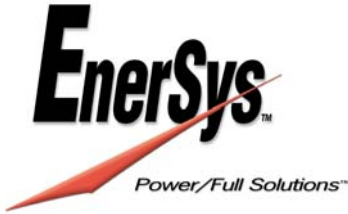
Over the past few years, EnerSys has become aware of certain Uninterruptible Power Supply (UPS) systems that utilize intermittent charging algorithms on the batteries. This intermittent charging basically allows the batteries to go into open circuit for a period of time until they are intermittently charged at a voltage generally greater than the normal float voltage of the system. The implied goal of this regime is to improve battery life and reduce energy consumption.

EnerSys also understands that there has been reported success with these algorithms, however our investigation reveals that these “successes” are based on small Ah size products. These products are typically 12V blocks and under 65Ah in size. In many cases, the demonstrated field life is between 1 ½ and 2 ½ years. There have been reports of battery life in excess of 3 years by using intermittent charging regimes.

While this is being reported as a success, the linkage to intermittent charging can be questioned. Moreover, any perceived successes here should not be used or applied to other products – products like 2V AGM, 2V flooded or other larger block battery sizes.

Battery life is typically limited by the corrosion reaction on the positive plates. The rate of corrosion has been studied and determined to have a direct link to the plate polarization or float voltage. Below is a chart that graphically depicts the rate of corrosion on a positive plate against the plate polarization most commonly measured through float or charge voltage.





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One can see that any perceived improvement or reduction in the positive grid corrosion rates is actually untrue. At open circuit the grid growth acceleration factor is 4x's that of when it is on at normal float voltage.

Further, after the battery has finished the period of open circuit, it is usually charged at an elevated voltage, one that is significantly higher than the normal operating float voltage. From the chart above, we can also see that the grid growth acceleration factor can be 2x's that of which it would be at normal float.

When batteries are installed in strings, depending the algorithm used, the charging phase might not be sufficient to fully recharge and equalize or harmonize all blocs to the same charge level. This could lead to progressively unbalanced strings, wide voltage dispersion and eventually premature failure by sulfation for the blocs staying at lower charge level.

Lastly, it is imperative that the battery is truly on open circuit and that there are no parasitic loads on the battery that would lead to overdischarge.

It is based on this information that EnerSys continues to recommend that batteries be operated in a float environment for longest battery life.