Minit-Charger® Method of Ameliorating Electrolyte Stratification during Opportunity Rapid Charging

Description

Electrolyte stratification is a well-known phenomenon with conventional battery charging and one that is particularly pronounced with fast charging. It is caused by gravity pulling the heavier than water sulfuric acid, produced at the battery plates during charge, down to collect near the bottom of the battery cell. The higher level of acid concentration at the bottom of the cell will result in sulfation of the lower portion of battery plate. Left unchecked the battery capacity and life will be dramatically reduced.

To eliminate stratification conventional battery chargers will typically overcharge by 10 to 20% at the end of charge cycle. The level of overcharge is low and may last for several hours. The gas produced during this overcharge form small bubbles that slowly mix the electrolyte as they rise to the top of the cell. This method of gentle mixing at the end of charge is not compatible with opportunity fast charge applications for several reasons:

- A battery that now operates by regularly receiving only partial recharge cycles will spend most of the time with stratified electrolyte resulting in plate sulfation.
- Long slow overcharge periods will result in an accelerated rate of grid corrosion and active material deterioration that is detrimental to battery life, particularly at elevated operating temperatures typically experienced with opportunity charging.
- When several batteries are being fully charged at once (in parallel) there will be extensive simultaneous gassing that may result in personnel safety and air quality concerns.
- This process is time consuming and energy inefficient

Minit-Charger® has developed and implemented a new method of electrolyte de-stratification (USA and international patent pending), that employs a controlled brief overcharge pulse at various stages of the charging process. The main features of this technique are:

- Electrolyte is aggressively mixed several times during the charge cycle, prior to receiving a full charge.
- Stratification of the electrolyte is eliminated, no sulfation occurs.
- Minimal amount of gas is produced several times during a charge cycle, low concentration levels.
- No personnel safety or air quality concerns.
- Proven effectiveness with no impact on battery life
- No extra time required
- Maximum energy efficiency