BATTERY WATERING INSTRUCTIONS

WARNING

WEAR EYE PROTECTION AND PROTECTIVE CLOTHING WHEN WORKING WITH BATTERIES.

ELECTROLYTE IS HIGHLY CORROSIVE. IF ELECTROLYTE SPLASHES INTO THE EYES OR ONTO THE SKIN, RINSE WITH PLENTY OF CLEAR WATER AND SEEK IMMEDIATE MEDICAL ADVICE.

FOLLOW THE SAFETY DATA SHEET (SDS) FOR ADDITIONAL INFORMATION INCLUDING HAZARDS IDENTIFICATIONS, ELECTROLYTE FIRST AID MEASURES AND PRECAUTIONS FOR SAFE HANDLING AND USE.

The following provides the recommended watering instructions for the cells. Cells should be filled with **ONLY** deionized (DI) water using the instructions below for best performance. Using other liquids will cause permanent damage to the cells. **FAILURE TO FOLLOW THIS PROCEDURE WILL VOID THE MANUFACTURER'S WARRANTY.**

GENERAL INFORMATION

During shipment and storage, the electrolyte level within each cell may become variable. Upon receipt, the electrolyte level may appear to be below the minimum fill line (see **Figure A3-1**). Do NOT add deionized water to the cells in this discharged state, as this will cause the electrolyte overflow during the first charge cycle.

Following system installation, the first cycle should be an initial charge and discharge of the battery system to condition the system. During the first cycle, the cells should be filled will deionized water during the rest immediately following the first charge cycle using the watering system and following the directions below.

Electrolyte levels of the cells should be monitored periodically. There are two fill lines identified on the labels on each cell showing minimum and maximum fill levels (**Figure A3-1**).

- The minimum fill line indicates the electrolyte level, at the end of discharge cycle, which would trigger a watering after the subsequent charge cycle.
- The maximum fill line indicates where the automatic stop valve will stop the flow of DI water when using the automatic watering system. Note: Only use automatic watering system after a charge cycle.

Frequency of filling cells will be dependent on the charge current and amount of charge input of the battery application. Increased current and charge input will increase the frequency of filling cells. During conditioning/maintenance cycling, electrolyte levels will require more frequent monitoring/filling.

Figure A3-1: Cell Showing Minimum and Maximum Fill Lines

DETAILED CELL WATERING INSTRUCTIONS

1. Electrolyte levels of all cells should be monitored for the need for filling at the end of a discharge cycle on a periodic basis.
2. If the electrolyte level at the end of a discharge cycle is below the minimum fill line on any cell in the battery system, the cells require watering. DO NOT WATER USING AUTOMATIC WATERING SYSTEM DURING DISCHARGE OR IN REST AFTER A DISCHARGE CYCLE.
   IMPORTANT: Watering of the cells using the watering system with automatic stop valves should **ONLY** occur at the end of a charge cycle or during the rest immediately following a charge cycle. In high voltage systems, the rest after charge cycle is recommended. The end of a charge cycle represents the highest level the electrolyte will rise during a cycle. Thus, watering during this time using the automatic stop valve will protect against overflow of electrolyte during charge. Filling cells during any other time using the automatic stop valves may cause electrolyte overflow during charge.
3. If visual monitoring during a discharge cycle triggers a watering event due to electrolyte levels being below the minimum fill line, use the watering system during the rest after the subsequent charge cycle to fill all the cells in the system with DI water.
   a. Connect the water pump (manual bulb or electric pump) to a source of DI water.

b. Connect the water pump to the ¼" Barb Male Coupler with Dust Protector that connects to the watering manifold system.
c. Pump DI water through the system until the cells are full.
d. The watering valves are equipped with an automatic stop valve which will stop the flow of DI water into each individual cell as each cell reaches the maximum fill line.
e. Stop pumping the DI water when the water stops moving. In a manual pump situation, the pressure required to pump water will increase to a point where the water no longer flows under manual pressure. Most electric pumps have visual indicators that will stop moving at this point.

GENERAL MAINTENANCE

- If electrolyte rises and leaks from the valve(s) during charge and not during a watering event, the cell(s) have been overfilled during a previous cycle.
- If the electrolyte level rises above the maximum fill line during watering and electrolyte exits through the valve vents, the watering valve requires maintenance. Use the valve wrench to remove the valve. Rinse the valve with DI water and test for restored functionality of the automatic stop valve. If functionality cannot be confirmed, replace the valve.
- If DI water leaks from the top of the valve from the port of the tube fitting tee while filling cells, the O-ring on the tube fitting tee needs replacing.
- If a cell is not receiving water during a watering event, the valve may be closed shut and requires replacing. Use the valve wrench to remove the valve and replace the valve with a new valve.
- Clean up all leaks/spills with plenty of water before restarting the batteries.