

*Surrette Battery Company Ltd.*

## Product Manual for Deep Cycle Batteries



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QS CODE	PI 001
Revision No.	0.1
Date Issued	19-Sep-00
Supersedes	NONE
Number of Pages	Error!

## Product Manual

### **INTRODUCTION**

This instruction manual will provide you with the information to safely own, operate and maintain your deep cycle batteries or cells.

#### Receiving Your Product

Before signing for the shipment, inspect it for damage and make a note of it on the shipping documents. If damage is found after delivery please contact the freight company, your dealer and Surrette Battery. Freight companies, in general, will not admit liability unless damage is documented at receiving.

### **OPERATION**

Safety: A product MSDS is available upon request and safety tips are summarized as follows:

- NEVER short-circuit a battery.
- NEVER add seawater to a battery.
- NEVER smoke around a battery bank.
  
- ALWAYS wear safety glasses and gloves when working around a battery bank. Protective clothing such as an apron and steel toes is suggested and may be required during installation or when handling acid.
- ALWAYS provide adequate ventilation especially during equalization.
- ALWAYS remember you are working around electricity and a battery bank has the potential to deliver a severe shock.

#### Product Do's and Don'ts

- Do properly follow the instructions given in this manual.
- Do contact your dealer or Surrette Battery Company Ltd. if problems or questions arise.
- Do isolate starting batteries from the main battery bank.
  
- Don't add acid to batteries once they have been cycled.
- Don't allow the batteries to exceed 125°F (52°C).
- Don't charge batteries of different types (size) together.

## Service Instructions:

This section describes preventive maintenance and recommended charging procedures to maximize battery life. The leading cause of premature battery failure is improper charging and poor battery maintenance.

Equalization is very important and must be performed correctly but only as required.

### **Preventive Maintenance**

When a battery is first received the cell acid levels should be checked and the battery should be put on charge. After removing from charge the specific gravity readings of each cell should be recorded and kept for the life of the battery.

Preventive maintenance involves, at a minimum, checking the cell electrolyte level for correct acid volume once a month and equalizing once every six months. The cells should be watered back to the original acid level which is  $\frac{1}{4}$  -  $\frac{1}{2}$ " below the bottom of the vent well (tube inside the battery cell with slots on each side). Distilled water is highly recommended. Water containing high minerals or iron will dramatically reduce the battery life.

A recommended preventive maintenance program can be summarized as follows:

1. Water each cell to original level as required
2. Equalize as required or once every six months
3. Record the specific gravity readings of each cell every three months.

Occasionally cleaning the battery terminals and case / cover is a good practice and recommended. A weak solution of household baking soda and water can be used to neutralize any spilled acid (100 g per liter or 4 Oz per pint). Make sure the vent caps are securely tightened and NO soda solution gets into the battery cells.

Good record keeping is stressed as review of these records can help to determine the "health" of the battery and can prove invaluable if system problems develop.

### **State of Charge and Charging**

The truest measure of a battery's state of charge is the SPECIFIC GRAVITY of the battery acid. The following shows the approximate state of charge at various specific gravities at 77°F / 25°C.

<u>% Charged</u>	<u>Specific Gravity</u>	<u>% Charged</u>	<u>Specific Gravity</u>
100%	1.255 – 1.275	25%	1.165–1.155
75%	1.215 – 1.235	0%	1.130-1.110
50%	1.200 – 1.180		

We strongly recommend a three step charging procedure. Recommended voltage settings are as follows:

	<u>(Volts per cell)</u>	<u>12V</u>	<u>24V</u>	<u>48V</u>
Equalization	2.58 -2.67(max)	15.5-16.0	31.0-32.0	61.9-64.1
Absorption / Bulk	2.37-2.45 (max)	14.2-14.7	28.4-29.4	56.9-58.8
Float	2.20-2.23 (max)	13.2-13.4	26.4-26.8	52.8-53.5

To calculate the correct settings for another battery bank voltage divide the total nominal voltage by two and use this number as a multiplier. For example a 18V system,  $18 / 2 = 9$ , equalization preferred =  $9 \times 2.58 = 23.2 \text{ V}$

**CAUTION:** The ideal float voltage is the lowest voltage setting that will maintain the battery at full charge. The higher the voltage the more water the cell will consume. The minimum equalization voltage is highly recommended unless it is suspected a sulphation problem exists.

### Equalization

Equalization is required to mix the battery acid and bring every battery plate to an equal charge. Equalization should only be performed when required or once every six months. Equalization is required when the cell specific gravities vary from highest to lowest by +/- 0.015 (1.245 – 1.260 at full charge).

The exact particulars (such as charging time and currents) are dependent on the charging system. However, the point is to bring the batteries up to the equalization voltage and continue charging for 1-2 hours at a low current, without excessive heat. The final or finishing charging current should be 3-7% (we recommend 5%) of the 20 hr capacity in amps. If battery temperature exceeds 125°F the battery should be taken off of charge and allowed to cool before equalization is continued. When two consistent specific gravity readings are taken a half hour apart the battery is equalized.

It is recommended to water the battery cells before or half way through the equalization. This is to assure the water is completely mixed into the electrolyte.

**Caution:** If you have **HYDROCAPS** *remove* during equalization.

## BATTERY STORAGE

Before storing battery(s) for an extended period of time the batteries should be watered and equalized. If not, the battery(s) will sulfate and could freeze.

Disconnect the bank leads.

Store battery in a cold and dry area in order to lower the amount of self-discharge. You would expect a Surrette (Rolls) Battery to lose about 3-7% of its capacity per month. The maximum storage length is 6 months if the bulk of the storage was at cold temperatures (32°F or 0°C). If the battery(s) are stored in warmer climates fully charging the bank is recommended every three months.

It is NOT recommend leaving the batteries on a float or trickle charge when stored unless power is required for critical components such as a sump or bilge pump. If this is the case they are really NOT stored but, in fact, on float service.

## WARRANTY

For full details please see the official warranty policy which can be summarized as follows:

500 / 5000 series batteries: 3 years free replacement and prorated to 120 months.

500 / 5000 series cells: 3 years free replacement and prorated to 60 months.

400 / 4000 series batteries: 2 years free replacement and prorated to 84 months.

Warranty covers manufacturing defects and does not include problems and failures arising from poor maintenance and improper charging techniques. The warranty does not cover cracked or broken battery cases.

## PRODUCT RECYCLE

All lead acid batteries are fully recyclable. Please contact your local waste management center or depot for further details.

## TECHNICAL ASSISTANCE

You should always contact your local dealer first, but remember we are always here to help. Please call 1-800-681-9914 or e-mail us at [sales@surrette.com](mailto:sales@surrette.com) if further assistance is required. Please note we actively keep a customer comment log and any concerns or suggestions to help us better serve our customers are always welcomed and encouraged.