BAE ENERGY FROM BATTERIES

Manufacturing high integrity batteries since 1899 – ISO 9001

STATIONARY BAE BATTERIES:

Installation and Operating Instructions

2V OPzS Cells

OPzS Blocks

OPzS-N6 Blocks

2V OGi Cells

OGi Blocks

OGI-N6 Blocks

BAE ENERGY FROM BATTERIES

Manufacturing high integrity batteries since 1899 – ISO 9001

STATIONARY BATTERIES, Installation and Operating Instructions

This special publication deals with the essential requirements which must be taken into consideration for the storage, assembly and commissioning of the BAE OGi and OPzS stationary lead- acid batteries and supplements the standard operating instructions for the handling of these batteries.

1.0 RECEIVING OF STATIONARY BATTERIES

Every precaution has been made in packing these batteries for shipment to assure their safe arrival. As soon as the battery is received please check the packaging materials for evidence of damage in transit. Wet acid stains may indicate spillage or leakage of electrolyte and crushed "Do Not Stack" cones or damaged boxes could be evidence of rough handling during transit. If any of the above is observed, make a note of it on the bill of lading before signing.

NOTE: Shipping damage must be handled with the carrier -- not BAE Batteries USA

1.1 UNPACKING-HANDLING

Single cells and multi-cell blocks may be received packed in individual Styrofoam containers with shrink-wrap or packing cases, surrounded by foam, shrink-wrap and attached to a wooden pallet- **Carefully** open the cases or carton to avoid possibly damaging any of the cells or blocks.

Note when removing the blocks or cells from the containers or cases always lift cells from the bottom, never from the connectors or cell posts as this can damage cell covers or post seals and void your warranty. Note a lifting sling may be used on the larger capacity cells-slip the lifting sling under the cell and use the loops in the sling for hoisting the cell.

If the cells were ordered wet, immediately check the electrolyte level in each cell or bloc. It should be between the maximum and minimum level lines on the container. If the level is below the minimum line, check the container for damage and file a claim against the carrier if necessary. If your visual inspection, after unpacking, indicates damaged or broken posts, cell covers, file a claim against the carrier and contact your local BAE Representative.

1.2 ACCESSORIES

Upon receiving the battery systems check the accessory packages against the included packing list for contents making certain that all the parts ordered with your system have been received. Place the accessories along with the installation and operating instructions in a safe location to avoid misplacing or loss. If you find that any of the items listed on the packing list are missing please contact your local BAE sales representative immediately.

2.0 STORAGE AND MAINTENANCE

BAE lead-acid batteries can be supplied either in a fully charged ready to used filled (wet) state or in a dry-charged or unfilled state for either pro-longed storage or export.
Packaging depends on transit routes (domestic or export) and varies from simple shrink wrapping on a pallet to seaworthy crating for export or special request.

Stationary BAE Batteries: Installation and Operation Instructions

2.1 STORAGE AND MAINTENANCE PROCEDURES FOR WET CHARGED BATTERIES

Batteries which have been filled (wet) and charged may be stored without further charging only for a limited period, because of self discharging and related chemical processes. After a maximum storage period of 12 weeks (or 8 weeks at ambient temperatures at above 35°C (95°F) the batteries must be charged by connecting to a proper charger which can either maintain a continues float charge of 2.23 volts per cell or can provide an equalization charge to the cells. (See section 6.2)

To ensure that each cell has been fully recharged before disconnecting the charger all of the cells should be checked for both voltage and specific gravity to ensure that they are with the prober range for the cells. (See sections 8.2 and 8.3)

2.2 STORAGE AND MAINTENANCE PROCEDURES FOR DRY CHARGED BATTERIES

In a dry and charged condition, lead-acid stationary batteries may be stored virtually for an unlimited time period. However, for extended storage periods, particularly at temperatures above 25°C (77°F) the strength of pre-charge decreases gradually. This must be taken into account when the battery is eventually put into service.

To maintain the complete pre-charge of the cells for the longest possible period of time storage temperatures between 5°C (41°F) and 30°C (86°F) should be maintained. Further, excessive temperature variations during the storage period must be prevented to avoid moisture or condensation in the cell. To prevent any damage or deterioration to the cell container and posts, exposure to constant direct sun light must be avoided.

Cells should always be stored in an upright position and never stacked.

To prevent air from reaching the plate area, the cell filling holes are provided with special shipping plugs, which should not be removed until immediately prior to filling with electrolyte and putting into service.

NOTE: AFTER FILLING THE CELLS WITH ELECTROLYTE, THE SHIPPING PLUGS HAVE TO BE REPLACED WITH THE FLAME ARRESTOR VENT CAPS WHICH ARE SUPPLIED WITH THE CELLS IN THE SHIPMENT

3.0 BATTERY INSTALLATION

We recommend that batteries should not be installed in battery rooms that are still under construction; this avoids the risk of damage to the batteries during construction.

3.1 ELECTROLYTE HAZARDS

The electrolyte is dilute sulfuric acid, which is harmful to skin, and eyes. It is electrically conductive and corrodes unprotected metal surfaces.

PRECAUTIONS

1. Wear full eye protection, rubber or plastic gloves, apron and boots.

2. If electrolyte contacts skin, wash if off immediately with large amounts of water. If it contacts the eyes, thoroughly flush with water and seek immediate medical attention.
3. Neutralize any spilled acid with a weak alkaline solution of 1 pound of bicarbonate of soda dissolved in 1 gallon of water.

3.2 ELECTRICAL HAZARDS

A filled and charged battery presents a high voltage, high current shock and short circuit hazard.

PRECAUTIONS

Observe standard safety measures when working on batteries:

1. Remove watches, rings or metal jewelry.
2. Wear rubber gloves and boots.
3. Use insulated tools.
4. Disconnect the charger and load prior to closing and/or opening battery connections.

3.3 BATTERY INSTALLATION

The installation of the individual cells is dependent on the size and type of cell and the intended application of the battery. Standard designs provide for installation in battery cabinets, conventional steel racks or seismic (earthquake resistant) racks.

For all installation options the ideal designs should include acid- resistant coatings and rail insulation to ensure that the required insulation resistances between rack and battery are maintained over the life of the batteries.

All racks should be properly aligned and all bolted parts tightened thoroughly before the cells are placed on them. Levelers should be used to compensate for irregularities in the floor surface. To position the cells on rack special auxiliary equipment, such as lifting straps or other mechanical lifting gear may be required. If necessary this equipment may be obtained from BAE Batteries USA.

You may wish to use an alignment wire to aid in placing the cells properly on the rack; it is recommended that the distance between the cells be determined from the center of the rack. In this way, it is possible to make allowances toward the end of the rack(s).

3.4 INTER-CELL CONNECTORS

The individual cells are connected by using either the included thermoplastic-insulated copper connectors or the lead plated copper connectors (type dependent on cell type and customer preference) and are bolted to the threaded insert post using either a stainless steel M10 Allen head bolt or a 17mm hex head bolt (bolt type depended on cell type).

Prior to connector to cell assembly the plastic post covers should be removed and the post contact surfaces should thoroughly cleaned by using a wire brush and a clean rag. (NOTE: Caution should be taken when using the wire brush as not to make contact with other exposed metal areas to prevent short circuits.) Once clean the post contact surfaces should be given a light layer of no-ox grease, these steps will insure the very best possible connection surface; once these surface preparation steps are completed connector to cell assembly can be performed.

All bolted connections should be made with use a torque wrench to insure proper tightness of the connection without causing any damage to the battery posts. The torque settings for both of BAE bolt types (both the M10 Allen and 17mm Hex) is 22 Newton-meters or 195 (194.7 actual) inch-pounds.

3.5 RACKS (Existing Rack)

If the cells are to be placed on an existing battery rack, the following inspection should be made prior to installation to avoid any possibility of damage to the new battery.

1. Inspect all bolted connections making sure they are all properly aligned and tightened.

2. Check all painted surfaces making sure everything is clean and free of corrosion.

3. Make sure the rail insulation is clean and in place.

If deficiencies are found with the existing rack-DO NOT INSTALL THE NEW CELLS UNTIL CORRECTIVE ACTIONS ARE TAKEN.

If your inspection indicates that no corrective action is required, proceed with the cell installation.

3.6 RACKS (New Rack)

Carefully unpack rack materials using care not to scratch the coated surfaces. Check received parts against the Bill of Materials for the individual rack. If you find damage to the rack components, file a claim against the carrier.

Refer to the assembly drawing and rack installation instructions and proceed with rack assembly.

* When assembled, battery racks must be level and in conformance with the rack manufactures drawings and specification supplied with the equipment, this will ensure that neither individual cells nor rack assembly can topple, twist or overturn.

* Do not place battery cells on the rack until the rack has been completely assembled and all bolts have been tightened, otherwise the weight of the cells may cause the rack to shift and collapse.

* Never remove or loosen braces from a loaded battery rack, removal of braces could allow the rack to shift or collapse.

4.0 FILLING WITH SULFURIC ACID

Caution is required when handling sulfuric acid-Sulfuric acid is highly caustic! Wear protective eyewear and clothing!

It is not recommended that you attempt to mix sulfuric acid for use in your stationary batteries yourself-contact your local BAE representative for local suppliers.

Immediately prior to filling, the temperature of the acid should be checked and recorded. (The temperature should be in the range of l5°C (59°F) to 25°C (77°F.) Under no circumstances should the temperature fall below 5°C (4l°F) or rise above 35°C (95°F). The shipping plugs must be removed from the filling holes and the cells filled to a level 5mm to 10mm (.20 inches to .40 inches) below the maximum mark. After each cell is filled, insert a thermometer into the filling hole and read the temperatures of the cell approximately 30 minutes after filling. The difference in acid temperature before and after filling must be determined for each cell. This difference in temperature will indicate the amount of pre-charge that has been lost in storage and essential in the further handling in regards to the commissioning of the battery. (Refer to Section 5)

5.0 BATTERY COMMISSIONING

For cells supplied dry charged initial charging may be commenced 2 hours after filling has been completed. To prevent self-discharging the waiting time between the completion of the filling operation and the start of the charging operation should not exceed 15 hours.

Prior to starting the charge make sure to check all of the connections for tightness and make sure that you have proper polarity on each cell. Remember, the positive connection of the charger must be connected to the positive terminal of the battery.

5.1 BATTERIES, IN NORMAL DRY CHARGED CONDITION

The charge of a battery has not been lost if the increase in the acid temperature in all cells is less than 5°C (9 °F) or if the concentration of the sulfuric acid decreases less than 0.02 Kg/L after being filled with electrolyte.

The residual capacity of these batteries is approximately 85% of the rated capacity. For this reason, it is not necessary to use an initial start up charge but rather to put the battery on float immediately at 2.23 volts per cell.

5.1.1 COMMISSIONING VIA FLOAT CHARGE VOLTAGE - 2.23 VPC

After a period of 24 hours of being on a float charge (2.23 VPC) the battery should be in a fully charged condition, however the individual cell voltages and specific gravities may still not be within the stipulated tolerances for continuous operation.

Note: The allowable tolerance in voltage and specific gravity for the BAE block and single cells is as follows.

Single Cell Voltage Tolerance is +0.1 or -0.05V as compared to the nominal voltage of 2.23; this gives us a range of 2.18 to 2.33 volts

Single Cell Specific Gravity Tolerance is ±0.01 Kg/L as compared to nominal specific gravity at 25°C (77°F) which is 1.240; this gives us a range of 1.230 to 1.250

5.1.2 USE OF HIGHER CHARGING VOLTAGES - 2.35 to 2.40 VPC

If the charger is equipped with an equalizing mode (usually 2.35 to 2.40 VPC) it is possible to accelerate the charging process. Instead of a 24-hour float charge, 12 hours at the increased voltage should be sufficient to bring the battery to a fully charged condition.

5.1.3 COMPLETION OF THE COMMISSIONING

Fill the cells with the proper density acid to the maximum line and record the voltages and specific gravities of the individual cells. The voltages and specific gravities should be within the stipulated tolerance levels after a 3-month time period. If the cells do not respond and the tolerance level is not met at that time, notify your local BAE representative.

5.2 COMMISSIONING BATTERIES THAT HAVE BEEN STORED DRY CHARGED WITH EVIDENCE OF SELF DISCHARGING

If an increase in the cell temperature of between 5°C (9 °F) and 15°C (27 °F) or decrease in specific gravity 0.02 Kg/L and 0.05 Kg/L is noted in all or several cells after filling with

electrolyte, this should be construed as evidence that the battery has suffered a partial self-discharging condition.

The battery should be charged at float charge of 2.23 VPC for a period of 1 to 2 weeks to reach a fully charged condition.

Under these conditions, the specific gravity when measured above the plates either during or immediately after charging is not a measure of the actual battery condition, as it may take up to 2 months for the acid to mix thoroughly. This does not affect the operating function of the battery. As previously indicated in 5.1.2, by using a higher voltage (equalizing mode) the battery response time is much less.

5.3 COMMISSIONING OF BATTERIES WITH EVIDENCE OF EXCESSIVE SELF DISCHARGE

If an increase in the cell temperature above 15°C (27°F) or a decrease in specific gravity of more than 0.05 Kg/L is noted in all or several cells after filling with electrolyte, it should be construed as evidence that the battery has suffered excessive self-discharging. This may be the result of an extensive storage period under unfavorable conditions (moisture, high temperature or extreme variance temperature - refer to section 2.2).

Commissioning under these conditions require a special procedure.

a) Continuous charging for 72 hours at 2.33 to 2.40 volts per cell

b) If charging by a constant current charger, the commissioning times may be shortened as follows: Charge 3 to 5 hours at I=15A/100AH with cell voltages up to 2.40 VPC followed by charging with a reduced current of I=5A/100AH, at this rate the cell voltage will increase from 2.60 to 2.75 VPC, cell voltages and temperatures must be recorded hourly. When the voltage become fairly constant the specific gravities of each cell should be checked, the charging operation should be terminated when voltage and specific gravity of the cells becomes constant, but not should exceed a total charging time of 24 hours.

c) If charging by a tapering current system, the current must taper from 7A/100AH to 3.5A/100AH when the battery voltage increases from 2.40 VPC to 2.60 VPC, commissioning under this method should also not exceed a total charging time of 24 hours.

CAUTION

To prevent damage to the battery, it must be ensured that excessive high currents are not allowed when cell voltages exceed the 2.40 VPC. Furthermore care should be exercised not to allow electrolyte temperatures to exceed 55°C (l3l°F). If this maximum temperature is reached at any time STOP CHARGING until the battery has reduced.

5.4 COMMISSIONING BATTERIES THAT ARE SUPPLIED WET AND CHARGED

These batteries must be connected to the float-charger and charged at 2.23 VPC, no special action or equipment is required for commissioning of these cells since they arrive in a fully charged ready to use state.

Please check the electrolyte levels of each cell. Although these cells have been filled to maximum level before leaving the factory, levels may drop during set up and initial charging for the following reasons:

1. Further degassing in the cell due to movement and vibration during shipping/handling.

2. Loss of electrolyte through spillage in handling or shipment.

If after 24 hours of being on a float charge the electrolyte levels are not at the maximum level, top off cells with purified or distilled water.

6.0 INSTRUCTIONS FOR OPERATION

This is supplementary to the standard instructions for the handling of stationary lead-acid storage batteries; the behavior of the BAE lead-acid of batteries is detailed here in this section.

The instructions for maintenance contained in the following section should be combined or may be supplemented by site specific detailed procedures for necessary testing and inspections. Special testing may required under certain conditions (DIN, VDE, and KTA for export) and IEEE for domestic applications as set forth by the user.

6.1 FLOAT CHARGING

BAE Stationary lead-acid storage batteries are designed so that optimum life and available capacity are achieved with a float voltage of 2.23 VPC. Higher or lower charging voltages can be detrimental as overcharging or undercharging will reduce the batteries life expectancy.

6.2 EQUALIZATION CHARGING

After deep discharges or after inadequate recharging equalizing charging is necessary, this can be carried out as follows:

a) At an increased voltage of (2.33 to 2.40 VPC) x number of cells up to a maximum of 72 hours.

b) At currents according to the I or W characteristics (See Section 6.3 below)

6.3 CHARGING CURRENTS

The charging current on the BAE cells need not be limited until the battery voltage has reached the gassing voltage of 2.40V x number of cells-thereafter the charging current has to be limited per the following chart.

Charging Process	Charging Current	Cell Voltage
I-Characteristics	5.0 A	2.60-2.75 VPC
W-Characteristics	7.0 A 3.5 A	at 2.40 VPC at 2.65 VPC

6.4 TEMPERATURE-RELATED CHARGING VOLTAGE

A temperature-related adjustment of the charging voltage within monthly averaged battery temperatures of 10°C (50°F) to 30°C (86°F) is not necessary. For temperatures below 10°C (50°F) in the monthly averaged temperature the charging voltage should be increased by 0.005 volts per 1°C (1.8°F) for a faster recharging. For temperatures above 30°C (86°F) in the monthly averaged temperature the charging voltage may be decreased by 0.004 volts per 1°C (1.8°F) to reduce water decomposition and corrosion.

6.5 OPERATING TEMPERATURE

All nominal data for BAE stationary batteries are stated based on an operating temperature of 25°C (77°F), the ideal operating temperature range for the BAE cells is 25°C(77°F) +/-5°C(9°F). Higher constant temperatures will reduce the anticipated life expectancy of the battery due to the increase in the corrosion rate of the cell plates. For example an increase in temperature of 8.4°C (15°F) over the norm of 25°C (77°F) would double the corrosion rate, thus this reduces battery life to 50% of the normal life expectancy. Correspondingly a further increase of 16.7°C (30°F) over the norm of 25°C (77°F) would further reduce the service life to 25% of the normal life expectancy.

Note: At no time should the electrolyte temperature of the cells ever exceed 55°C (131 °F) or permanent damage to the battery cells will result.

6.6 DISCHARGE CYCLE

A battery is discharged either when the discharge duty cycle is performed when the A.C. voltage supply fails or when battery capacity tests are conducted on the system. When setting up routine maintenance procedures that include in-service capacity tests, it should be noted that frequent boost charge/cycles could reduce the service life of the battery.

Note: For the discharge of a storage battery, a specified minimum value is designated for each discharge current as a final discharge voltage. These values are stated in the data sheets for that particular BAE battery type and must not be exceeded.

6.7 RECHARGING CYCLE

Fully discharged and/or partially discharged batteries must not be allowed to remain in a discharged state for any extended time period, as damage may occur. Therefore, it is necessary to begin recharging immediately after a battery has been discharged. If sufficient time is available to re-charge, the safest method is to use the float mode of the charger which returns the battery to 2.23 VPC upon completion.

The specific gravity when measured above the plates should not be construed as an indication of the battery state of charge after a discharge as complete mixing of the electrolyte may take up to 3 months. This will not affect the battery's function so long as the individual cell voltages are 2.23 volts + .10 and -.05 volts and the battery string in no longer taking high current.

If a complete recharge is to be accomplished within a limited time period (12 hours.) or if the discharged battery has been more than 48 hours without charge, it will be necessary to charge at a higher voltage for a brief period. (See equalization charging section 6.2)

7.0 VISUAL INSPECTION

A visual inspection of the battery and all electrical connections should be made least once a year.

7.1 TOPPING OR WATER ADDITIONS

Water must be added to any cell when that cells electrolyte level has dropped to the minimum level line. Under normal operating conditions, topping or water additions becomes necessary at intervals of 2 to 5 years depending on the cell model. Water consumption remains virtually constant during the batteries entire service life. If operating temperatures exceed 25°C (77°F) or the battery is subjected to frequent recharging at high voltages, more frequent water additions may be necessary. Note: Use only approved purified or distilled water for topping off the cells.

7.2 CLEANING OF BATTERIES

Batteries should be kept clean and dry at- all times. Cell containers and cell covers made of plastic material may be cleaned with clear water. In certain circumstances, cleaners may be used (please consult with your BAE representative prior to use) however after application of the cleaning solution the cell should be rinsed with clear water and thoroughly dried with a clean cloth or paper toweling.

8.0 PERIODIC INSPECTIONS

The inspections described below may be performed and will serve as a means of checking the reliability of the battery system. It should be noted that special tests conforming to VDE 0107 and VDE 0108 (Export) and IEEE (Domestic), which cover verification of operational safety, are not taken into consideration under the following listed methods.

8.1 TOTAL SYSTEM VOLTAGE AND CURRENT

The total battery voltage at the terminal posts (positive and negative) during float charge is 2.23 VPC times the number of cells. (Example 2.23 VPC X 60 cells = 133.8 Total Battery Voltage) This overall voltage check should be made and recorded every quarter and if a deviation in voltage greater than +/- 1% is found the charger should be checked and adjustments should be made. The input current to the batteries should also be checked and recorded every quarter.

8.2 INDIVIDUAL CELL VOLTAGES

Pilot cells voltages must be taken and recorded on some of the cells on a 6 month basis and all of the individual cell voltages must be checked and recorded at least once per year. If the individual cell voltages are not within the allowable tolerances, you should then take the specific gravity readings of these cells which do not meet tolerance specifications.

> Single Cell Voltage Tolerance is +0.1 or -0.05V as compared to the nominal voltage of 2.23; this gives us a range of 2.18 to 2.33 volts

8.3 ELECTROLYTE DENSITY AND TEMPERATURE (Specific Gravity)

Pilot cells specific gravities and temperatures must be taken and recorded on some of the cells on a 6 month basis and all of the individual cell specific gravities and temperatures must be checked and recorded at least once per year. Note: Proper operation of BAE Stationary lead-acid batteries requires a fully charged condition and the following nominal acid densities (Specific Gravity) at the maximum electrolyte level.

> Single Cell Specific Gravity Tolerance for the BAE OGi and OPzS Cells; is ±0.01 Kg/L as compared to nominal specific gravity at 25°C (77°F) which is 1.240; this gives us a range of 1.230 to 1.250

For the correct evaluation of the measured acid density, it should be noted that specific gravity is greatly affected by deviations from normal service conditions.

* Temperature: Extreme high temperatures reduce electrolyte density; low temperatures increase the density. The change in density is 0.006 Kg/L for every 10°C (18°F).

* Electrolyte Level: Acid densities increase proportionally to the water consumption and the lowering of the electrolyte level.

* Insufficient mixing: If after recharging, water is added to the cells, this will result in lower specific gravity readings above the plates.

If the specific gravity in the majority of the cells is below the specified tolerance of -0.01 Kg/L the nominal value of 1.240 Kg/L, we can assume that the charge of the cells is insufficient. Under these conditions the procedures as specified under charging methods should be used-further the rectifier out-put load current should be checked for problems.

If the specific gravity of one cell or if isolated cells are below the specified tolerance, please contact your local BAE representative.

9.0 IN-SERVICE CAPACITY TESTS

Regularly scheduled capacity tests are not essential as a barometer of the available capacity of installed lead-acid batteries since deductions on the available capacity of the battery is possible, based on the acid density (specific gravity) of the cells. However, capacity tests which are required for specific reasons must be conducted in the following manner.

9.0.1 Discharge should be performed with a constant current or constant power type load unit. In the determining the correct current or power rate for the capacity test it is help full to take into account the operating conditions and specific site requirement. From this select a discharge time and current or power that best fits the requirements, these values are obtained from the BAE discharge sheets for you given battery model.

9.0.2 Prior to starting the discharge test, care must be taken to ensure that the nominal level of the electrolyte has the correct specific gravity at 25°C (77°F), which means the electrolyte temperature should be between 15°C (59°F) and 35°C (95°F).

9.0.3 The capacity test may be performed after the battery has been taken off of float charge. During the discharge the current must not fluctuate more than ±1% on an average from the nominal value. Short-term deviations up to ±5% from the nominal value are allowable for a maximum of 20 seconds.

9.0.4 Voltages at the terminals of a representative number of individual cells must be checked after 10%, 25%, 50%, 80% and 100% of the specific discharge period. These should be recorded into a time versus voltage chart; making sure that the final discharge voltages are recorded.

9.0.5 The final discharge voltage of a battery is obtained by multiplying the final discharge voltage of the individual cells by the total number cells. The minimum allowable final discharge current is dependent on the discharge current. These values can be obtained from the BAE data sheets.

9.0.6 The capacity test must be terminated when the discharged time assigned to the specific current has been reached or when the final discharge voltage at the end terminals has been exceeded. During this operation, the individual cell voltages may be 0.2V below the allowable final discharge voltage.

9.0.7 The measured capacity is the product of the discharge current and the discharge time. If the initial temperature was not 25°C (77°F) the measured capacity must be corrected to compensate. To obtain the actual capacity at the reference temperature of 25°C, 0.6% for

each 1°C (33.8°F) temperature differences must be added to the measured capacity. For discharge times less than one hour, the correction factor is 1% for 1°C (33.8°F) temperature difference.

9.0.8 If the stipulated capacity is not achieved, we request that you contact your local BAE representative. If the measured capacity of the battery is less than 80% of the stipulated capacity the battery should be considered for replacement.

9.0.9 Recharge the battery in accordance with the charging procedure as previously stated in the operating instructions immediately after the capacity test. For any situation not covered in these instructions, please contact your local BAE representative immediately for corrective action.