

HOW TO HANDLE **DRY CHARGE & MF BATTERIES**

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A. STORAGE

- 1. Always rotate your stock. Practise FIFO (First In First Out). Batteries slowly lose their charge, and good stock rotation stops batteries going flat in storage and makes sure that the customer buys a good battery.
- 2. Stock batteries in a cool, dry, well-ventilated area.
- 3. Protect batteries from excessive heat. (Heat causes batteries to lose charge more quickly, and excessive heat can damage batteries)
- 4. Store batteries in an upright position (To stop them falling over or leaking)
- 5. Do not stack batteries on top of other batteries. (To avoid scratching, and tearing labels. To avoid damaging terminals that stand proud of the lid).
- 6. Do not remove any seals from dry charged batteries until you are ready to commission the battery by filling it with acid. (The seal preserves the charge in the battery. If it is broken, air will enter and cause the battery to lose charge)
- 7. Store batteries on racks or on pallets, not on the floor. (Small stones or sharp points on a concrete floor can damage the base of battery and cause leakage).
- 8. Make sure handles are left in the flat (down) position. Upright handles are more likely to be damaged.

B. MAINTENANCE OF STOCK

- **Wet Charge Batteries**

- 1. Check the open circuit voltage of the batteries in your stock every month
- using a digital voltmeter or multimeter. If any have a voltage below 12.40
- V, give them a refreshing charge.
- 2. Scrap any batteries that drop below 11.00 V. (These batteries will have
- develop a sulphation that cannot be completely reserved by charging, and so
- will not give the expected performance and life to the customer).

- **Dry Charge Batteries**

- 1. If you keep the batteries cool and dry, and do not remove the seal, dry
- charged batteries do not need any other attention.
- 2. The maximum storage time of dry charged batteries before they are
- commissioned by filling with acid is 12 to 24 months.

C. COMMISSIONING

- **Wet Charge Batteries**

- 1. Do not supply a battery to a customer (end user) if the voltage is below 12.40 V. Charge any batteries with voltages below these values.
- 2. We recommend you check the condition of the battery before selling it using of Electronic Testers (examples are Midtronics or Bosch tester).

- **Dry Charge Batteries**

- 1. Only commissioning a dry charge battery when it is needed for customer.
- 2. If fitted, remove and discard any sealing plugs, tape or foil.
- 3. If fitted, remove and keep normal vent plugs and terminal covers.
- 4. For filling, use battery grade dilute sulphuric acid of specific gravity 1.27 1.29 kg/l at 25°C (Note: contaminated acid with impurities can seriously damage the life of the battery, in some cases reducing this to a few days. Do not use acid from old batteries.)

- 5. Fill each cell with acid to upper level, fill each cell one after the other and complete the filling in one operation.
- 6. Leave the battery for 20 to 30 minutes and then measure the open circuit voltage. If it is below 12.5 V charge the battery.
- 7. Fit the normal vent plugs and terminal covers.
- 8. Wash the battery with hot water and dry it.
- 9. Note that performance checks on newly commissioned dry charge batteries with modern electronic digital testers using conductance technology are not recommended. Examples are testers supplied by Midtronics or Bosch. The result can be misleading until the battery has undergone some service use.

D. ELECTROLYTE LEVEL (ACID LEVEL) IN SERVICE

- Do not top up to the maximum levels a battery that needs charging. (level rise on charging). However, if the levels are below the tops of the separators, top up with distilled water until the separator are just covered)
- Adjust levels to the maximum levels only after the battery has stood for at least an hour after charging.
- Never overfill a battery. (The acid may come out of the vent plugs when battery is being charge)
- Use only distilled water for topping up.
- When battery is in service, the electrolyte levels should be checked and adjusted to the levels given below.
- If the battery has a maximum line on the side of the container, fill to this maximum level.
- If there is no maximum line, but there are filling tubes projecting from the bottom of lid, fill to the bottom of the tubes.
- If there is not a maximum line nor filling tubes in polypropylene batteries, fill to 7mm below the bottom edge of the lid skirt or fill to 15 mm above the tops of the separators.

E. REMOVING BATTERIES AND INSTALLING BATTERIES ON VEHICLES

• REMOVING BATTERIES

- 1. It is good practice to tell the customer that, while you will do your best to keep the memory settings, it is possible these might be lost.
- 2. Make sure that the hand break is on, and that the car is in neutral or park. Switch off all electrical loads and remove the ignition key from the car. On some cars, the doors will lock when the battery is disconnected so this is why the key should be removed from car. Also switch off any non factory fitted alarms.
- 3. Disconnect the earth connector first. (This is normally the negative on modern vehicle). This can result in the loss of memory setting; please refer to the vehicle handbook.
- 4. Disconnect the live connector second. To prevent the connector shorting against the car, place insulator such as a rubber glove over the connector.
- 5. Remove the clamps.

- **PREPARATION OF A BATTERY FOR FITTING**
 1. Check that the battery has the correct polarity for the vehicle.
 2. Check that the battery has the correct height for the vehicle.
 - 3. It is good practice to place the old and new battery side by side to compare polarities, hold downs and performance level.
 - 4. Check that the battery is clean and dry.
 - 5. Check that the vent plugs or manifolds are firmly in position.
 - 6. Check that the battery has a voltage above 12.40 V. If not, charge the battery or use another that has a voltage above 12.40 V.
 - 7. Ensure the 2 terminal caps are still fitted at this stage.

- **PREPARATION OF THE VEHICLE**
 - 1. Clear away any items on the battery tray which might damage the battery. (Placing a heavy battery on a piece of sharp grit can puncture the bottom of the battery).
 - 2. Checked that the connectors, the clamps and the tray are clean and corrosion free. (If there is any corrosion, hot water instantly remove this). If there is severe corrosion which might affect the stability of the battery or has affected other parts of the engine compartment, have the vehicle checked by an authorised distributor)

- 3. Check that the alternator drive belt tension is correct. Refer to the vehicle handbook or service manual.
- 4. It is recommended that the electrical system, and particularly the charging system, of the vehicle be checked to make sure it is operating correctly. Refer to the vehicle handbook or service manual.

- **INSTALLING THE BATTERY**

- 1. Fit and tighten the clamps. These should be tight enough to secure the battery and not allow it to move. Do not overtighten.
- 2. Connect the live connector first to the correct battery terminal (normally the positive) after removing the terminal cap. Do not overtighten.
- 3. Connect the earth connector to the other terminal after removing the terminal cap. Do not overtighten.
- 4. Place the 2 terminal caps on the old battery that has been removed from the vehicle to avoid the possibility of short circuits.
- 5. The use of vaseline is not necessary on modern polypropylene batteries, but there is no disadvantage in using it.
- 6. Start the engine.

F. CHARGING OFF VEHICLE

- **Note : Please read before charging batteries**
- 1. Do NOT charge a battery if its temperature is below 3°C as the electrolyte may have frozen.
- 2. Charging the battery on the vehicle is not recommended.
- 3. A new, unused battery with a voltage below 11.00 V should be scrapped and not charged.

- **Type of charger and how to use these :**
- 1. Constant Current Chargers
- 2. Constant Potential Chargers
- 3. Boost Chargers

F. 1. CONSTANT CURRENT CHARGERS

These maintain a fixed, constant, preset current throughout the charging period irrespective of the battery on charge voltage.

Charging procedure with constant current chargers :

- a. Ideally, charge each battery on a separate charger unit. If this is not possible, charge batteries in series. We do not recommend charging batteries in parallel because it is not possible to control the amount of current passing through each battery. If batteries in different states of charge are being charged in series, each battery should be removed as soon as it is charged. (If you wait until the last battery is charged, some of batteries will be overcharged).
- b. Measure the open circuit voltage of the battery. To obtain a stable voltage, the battery should not have been used or charged for a minimum of 3 hours before checking the voltage.
- c. Charge the battery at the recommended charge rate. If you cannot set the recommended rate, extend or reduce the charging time on a pro rata basis. For example, if the recommendation is to charge the battery at 4.0 A for 6 hours ($24 \text{ Ah} = 4.0 \times 6$), charge the battery for 12 hours if you can only set the charger at 2.0 A ($24 \text{ Ah} = 2.0 \times 12$).

- d. If you are charging the battery below 11.0 V (overdischarged) that has been in service, a specialised charger capable of providing a very high charging voltage may be necessary, and the recommended current may not be obtainable at first. In this case, monitor the current and adjust as necessary during the charge.
If a battery has become overdischarged, it will have lost both life and performance because of irreversible sulphation. Charging may reduce further its potential life.

F.2. CONSTANT POTENTIAL CHARGERS

These maintain fixed, constant, preset voltage throughout the charging period.

The current cannot be set and will fall as the battery state of charge increases.

Charging procedure with constant potential and modified constant chargers :

- a. These chargers are normally design to charge one battery at a time.
- b. Stop charging when the battery is gassing freely and the battery voltage shows no increase over a period of at least 2 hours.
- c. Note. The majority of constant potential chargers are incapable of charging a severely overdischarge (below 11.0 V) battery in a realistic period of time. A minimum of 24 hours is normal

It might be impossible to charge an overdischarged battery.

F.3. BOOST CHARGERS

- These provide a very high initial current, and are used mainly to put some charge into a flat battery when it is needed urgently by customer. The current falls as the battery state of charge increases, and the battery temperature is monitored to make sure it does not overheat.
- **Charging procedure with boost chargers :**
- a. Boost charging is not recommended except in exceptional circumstances
 - eg a stranded customer, as this will reduce battery life, especially if a battery is boost charged more than once.
- b. Never boost charge any battery that is below 11.0 V as it will be too sulphated to accept a charge, scrap the battery or charge normally.
- c. Only use a boost charger that limits the charging voltage to a maximum of 14.2 Volts and that has a temperature monitor.
- d. Follow carefully the charger manufacturer's instruction.

G. CHECKING BATTERY PERFORMANCE

Electronic Tester using Conductance Technology

1. The latest generation of testers is digital. Examples are Midtronics and Bosch Testers. These will give an immediate decision on about 80 percent of batteries on service, including flat ones. In the remaining 20 percent of cases, the batteries need recharging before testing.
2. These tester shows whether the battery is in good, charged condition, whether it is discharged or whether it need replacing.
3. This is preferred method of checking batteries as it does not take any charge out the battery. It is also easier, quicker and safer.

H. MAINTENANCE IN SERVICE

General

Always refer to the information contained in the handbook or brochure supplied with the vehicle or equipment.

Definition of Maintenance Free

1. Our starter batteries for cars and commercial vehicles conform to the standard EN 50342-1:2006 for maintenance free characteristics. This means that in normal vehicle application in temperate climate operation, it is not necessary to add water.
2. The term maintenance free applies only when the battery is used in an approved automotive or commercial vehicle application.
3. The important thing for user to avoid OVERCHARGE of maintenance free battery, it would be better to avoid the using battery for public transportation such as: taxi
4. Maintenance free battery is not recommended for DEEP DISCHARGE applications.
5. When the battery is use in the vehicle, battery's indicator is good tools for user to know the batteries condition such as :

Green color : battery is still in good condition

Natural color : battery needed to be recharged condition

Red color : the user must replace the battery from the vehicle with a new one

Battery Maintenance in Automotive Applications

1. Carry out the checks below at the recommended vehicle service intervals.
2. Check the electrolyte level and top up with water if necessary.
3. Check that the battery is clean and dry and that the vents are not obstructed.
4. Check that the terminal connector and the clamp are securely connected and corrosion free.
5. If the battery is on a vehicle that is not to be used for an extended period (more than 1 month), disconnect it from the vehicle. Modern cars have electrical accessories that slowly discharge the battery even when the ignition key has been removed. Some accessories such as alarms, trackers, and phones can cause a battery to become discharged in a few weeks.
6. Fully charge the battery before storage and give it a refreshing charge every 3 months.