TESTS CONDUCTED ON BATTERIES:

- Hydraulic test – To measure specific gravity of electrolyte.
- High discharge test – To measure discharging current.
- Individual cell tests – Cell voltage can be measured.
- Cadmium test – Cell voltage can be measured.

SPECIFIC GRAVITY TEST (HYDROMETER TEST)

- Specific gravity is the rate of density of given fluid to density of water.
- Specific gravity test is performed to know the condition of the battery.
- There are two types of hydrometers.
  - **Ball type Hydrometer:** To use this hydrometer stick the rubber tube to the cell electrolyte, then squeeze and release the bulb. This draws electrolyte in to the glass tube, the no. Of balls that float indicates the batteries state of change. If all the balls float, then the battery is fully charged. If no balls float, then the battery is fully discharged.
  - **Float type hydrometer**: This has float with stem that sticks up above the electrolyte level in the tube. The float stem s marked to indicate the specific gravity of the electrolyte. The height of the stem above the electrolyte indicates batteries state of change.

CADMIUM TEST:

- This test is performed to know the chemical condition of plates and it is performed when the battery is either on-charge or discharge.
- A cadmium rod is enclosed in a perforated ebonite tube and is immersed in electrolyte. Then the rod is connected to the negative terminal of voltmeter and the positive terminal of voltmeter is connected alternatively to positive and negative terminals of the battery cell.
- The voltmeter shows reading for both positive and negative terminals .The 2 readings are then added to obtain potential difference between the plates. The plate in good condition will show potential difference of above 0 for positive plate and below 0 for negative plates.

HIGH RATE DISCHARGE TEST:

- This test determines actual capacity of the battery that converts chemical energy into electrical energy.
- This test should be conducted only if specific gravity of the electrolyte is more than 1.215.

- The prods of the tester are placed on the cell terminals and the voltmeter indicates the cell voltage.
- The duration the test is very small since high current of 100A – 200A flows across resistance.
- For a 12V battery, if the cell is fully charged, the test should show a battery voltage not less than 10V and other cells should show the same reading.
- Lower voltage readings indicate faulty cells or cell is not in proper position to hold full charge.

OPEN VOLTAGE TEST

- To conduct this test, very accurate and sensitive voltmeter is required.
- For a 2V cell, if a battery cell is in good condition and fully charged, it must have a open circuit voltage of 2.15V.
- The batteries which have been just charged should not be tested since gases on the plates would cause high reading. These gases should be eliminated by subjecting the battery to high discharge for few moments and we have to measure the open circuit voltage.
- If the voltage is 2.15V for 2V battery cell, then it indicates it is fully charged. Here 0.01 volt of open circuit voltage = 0.01 specific gravity of electrolyte.

Therefore, voltage of the cell = specific gravity + 0.840.

INSTALLING THE BATTERY

- Batteries should be fitted in easy accessible position.
- Battery connecting cables should be flexible ad sufficiently long to prevent strain on battery.

ELECTROLYTE LEVEL

- Check the level of the electrolyte periodically once in forth night or every 800 km.
- Add pure distilled water as necessary.
- Electrolyte level should be 1/4th above the top of separator.

TERMINAL CONNECTION

- Clamp connections to the terminal post must fit well to avoid contact resistance.
- All the corrosion products should be removed.
- Terminals should be washed, dried and covered with vasoline.

VENT PLUG

- Keep vent holes free from dust disposition.

BATTERY CHARGING:

- Batteries must be fully charged to have uniformity of the specific gravity readings and voltage of the cells.

TEMPERATURE OF THE ELECTROLYTE:

- The temperature of the electrolyte must not exceed 50°C during charging.
- Over charging, undercharging and over-discharging must be avoided.
- If the specific gravity of the electrolyte is 1.28, it indicates the battery is fully charged. If the specific gravity of the electrolyte is 1.125, it indicates that battery is fully discharged and it is corrected to 27°C