

## **INSTRUCTIONS FOR ACID FILLING AND FIRST CHARGING OF DRY, UNCHARGED “EXIDE India” TRACTION BATTERIES**

### **ACID FILLING INSTRUCTION:**

- Fill the cells with battery grade sulphuric acid of 1.260 +/- 0.005 specific gravity at 30 deg C conforming to the following specifications:

Iron ( as Fe ) percent by mass : 0.001 ( Max)

Chlorides ( as Cl ) percent by mass : 0.0003 ( Max)

- Flip top vent plugs are fitted on the cell lids together with basket- type electrolyte level indicators, the lower level corresponding to the minimum height of electrolyte in the cell. The stepped portion of the basket indicated the maximum level of electrolyte. However, the basket is visible only after opening the flip top.

- After initial filling, acid will soak into the plates and separators, and the level should be restored with more acid to the maximum level after around 6 – 8 hrs.

\* **Note:** If the electrolyte temperature exceeds 55 deg C, please allow it to drop below 42 deg C prior to the commencement of charging. If required, the cooling process should be facilitated by providing suitable fans / water bath ensuring that the same is accomplished with 4 to 6 hrs after pouring electrolyte.

### **PROCEDURE FOR INITIAL CHARGING:**

- During initial filling & charging, the batteries should be charged at Constant Current rate as specified in the catalogue, up to 2.75 volts per cell.
- The charging should be continued even after the battery reaches 2.75 volts per cell till no rise of the Voltage and sp. Gravity is observed in the cells and the readings remain constant for consecutive 3 to 4 hourly readings.

- The sp. Gravity of all the cells to be adjusted to 1.285 +/- 0.005 (the service gravity), using 1.400 sp. Gravity Battery Grade Sulphuric Acid / Battery Grade Water conforming to the following specifications:

pH level : 6.5 – 7.5

Heavy metals ( as Pb )mg/l : 0.1 (max)

Iron & manganese mg/l : 0.1 ( max)

Specific electrical conductivity

At 25 °C in dionic units: 5 ( max)

- Minimum Ah inputs should be 5 to 5.5 times of the Ah capacity of cell/battery.

\*Charging should be continued at constant current till

- a) All cells are gassing freely at top of charge voltage 2.75 volts per cell at finished rate.
- b) No rise of voltage for 3 to 4 consecutive hourly readings after 2.75 volts per cell (vpc).
- c) No rise of Sp.Gr. for 3 to 4 consecutive hourly readings after 2.75 volts per cell (vpc).
- d) Minimum Ah input (5 to 5.5 times of Ah capacity of cell/battery) is given.

#### **Theoretical inputs:**

- Filling in Acid Sp. Gravity: 1.260 +/- 0.005 at 30 deg C .
- Soaking time : 6 - 8 hrs.
- Initial Charging Current (Amps) :

At 6% rate of the Ah capacity of Battery up to 2.75 vpc, alternately 12% rate of Ah Capacity up to 2.36 vpc & at 6% rate up to 2.75 vpc, till end of charging.

Minimum Ah Input : 5 – 5.5 times of Ah capacity of Cell/Battery.

Approx. duration of initial charging: 75 to 80 hours, if required more.

During regular use the battery should be recharged with compatible Charger for traction batteries.

### **INTERRUPTIONS:**

The charge may be given continuously or in cycles of not less than 8 hrs charge and not more than 16 hrs rest, until it is completed.

### **ELECTROLYTE LEVEL:**

The level of electrolyte may fall slightly during the charge. Maintain it throughout the charge by adding acid as used for filling.

### **ADJUSTMENT OF ELECTROLYTE:**

- If at the end of first charge, the specific gravity of the electrolyte exceeds 1.290, withdraw some electrolyte and add battery grade water, continue the charge so that the water and acid are thoroughly mixed.
- If at the end of first charge, the specific gravity of the electrolyte is below 1.280 after voltage and specific gravities have remain constant for 2 to 3 hrs, withdraw some of the electrolyte and add acid of 1.350 to 1400 specific gravity, continuing the charge meantime.

### **NEVER MAKE AN ADJUSTMENT ON A CELL WHICH DOES NOT GAS ON CHARGE.**

Final working specific gravity should be 1.285 at 30 deg C.

**Note:** \* The correction factor to be applied for variation of specific gravity with temperature. Add 0.007 to the observed reading for every 10 deg C above 30 deg C to obtain the corrected reading at 30 deg C.

- Subtract 0.007 from the observed reading for every 10 deg C below 30 deg C to obtain the corrected reading at 30 deg C.

## **REFRESHING CHARGE PROCEDURE FOR** **“EXIDE India” TRACTION BATTERIES**

1. Check the Acid-level – should be at least above the separator level.
  
2. Charge at 0.1C5 Amps. for 12 hours minimum or till Specific gravity and Voltage of Pilot cells remain constant over a period of 3 hours.
  
3. Top-up to the maximum level with 1.260 – 1.280 gravity acid and continue charging at 0.05C5 Amps. for at least two more hours.
  
4. Give rest till electrolyte temperature comes down to 35°C before putting into application or conducting discharge test.

## **INSTRUCTIONS FOR ACID FILLING AND FIRST CHARGING OF GREEN PLATE “EXIDE India” TRACTION BATTERIES (JAR FORMATION)**

### **ACID FILLING INSTRUCTION:**

- Fill the cells with battery grade sulphuric acid of 1.250 +/- 0.005 specific gravity at 30 deg C conforming to the following specifications :  
  
Iron ( as Fe ) percent by mass           : 0.001 ( Max)  
  
Chlorides ( as Cl ) percent by mass    : 0.0003 ( Max)
- Flip top vent plugs are fitted on the cell lids together with basket- type electrolyte level indicators, the lower level corresponding to the minimum height of electrolyte in the cell. The stepped portion of the basket indicated the maximum level of electrolyte. However , the basket is visible only after opening the flip top.
- After initial filling, acid will soak into the plates and separators, and the level should be restored with more acid to the maximum level after 2 hrs.

\* **Note:** If the electrolyte temperature exceeds 55 deg C, please allow it to drop below 42 deg C prior to the commencement of charging. If required, the cooling process should be facilitated by providing suitable fans / water bath.

### **PROCEDURE FOR INITIAL CHARGING:**

- During initial filling & charging, the batteries should be charged using Constant Current charger as per schedule in annexure A.
- The charging should be continued even after the battery reaches 2.75 volts per cell till no rise of the Voltage and sp. Gravity is observed in the cells and the readings remain constant for consecutive 3 to 4 hourly readings.

- The sp. Gravity of all the cells to be adjusted to 1.285 +/- 0.005 (the service gravity), using 1.400 sp. Gravity Battery Grade Sulphuric Acid / Battery Grade Water conforming to the following specifications :
  - pH level : 6.5 – 7.5
  - Heavy metals ( as Pb )mg/l : 0.1 (max)
  - Iron & manganese mg/l : 0.1 ( max)
  - Specific electrical conductivity
    - At 25 °C in dionic units : 5 ( max )
- Minimum Ah inputs should be 7.2 times of the Ah capacity of cell/battery.
- Maximum temperature permitted during charging is 55<sup>o</sup> C. Preferred temperature range during formation is 45 - 52<sup>o</sup> C.

\*Charging should be continued till

- a) All cells are gassing freely at top of charge voltage 2.75 volts per cell at finished rate.
- b) No rise of voltage for 3 to 4 consecutive hourly readings after 2.75 volts per cell (vpc).
- c) No rise of Sp.Gr. for 3 to 4 consecutive hourly readings after 2.75 volts per cell (vpc).
- d) Minimum Ah input (7.2 times of Ah capacity of cell/battery) is given.

#### **Theoretical inputs:**

- Filling in Acid Sp. Gravity : 1.250 +/- 0.005 at 30 deg C .
- Pickling time : 2 hrs.

During regular use the battery should be recharged with compatible traction battery Charger.

#### **INTERRUPTIONS:**

The charge should be given continuously. A maximum interruption of 2 hrs due to unforeseen parameters during first 60 hrs of charging may be allowed. Any interruption should be avoided at discharge step.

#### **ELECTROLYTE LEVEL:**

The level of electrolyte may fall slightly during the charge. Maintain it throughout the charge by adding acid as used for filling.

#### **ADJUSTMENT OF ELECTROLYTE:**

- If at the end of first charge, the specific gravity of the electrolyte exceeds 1.290, withdraw some electrolyte and add battery grade water, continue the charge so that the water and acid are thoroughly mixed.
- If at the end of first charge, the specific gravity of the electrolyte is below 1.280 after voltage and specific gravities have remain constant for 2 to 3 hrs, withdraw some of the electrolyte and add acid of 1.350 to 1400 specific gravity, continuing the charge meantime.

#### **NEVER MAKE AN ADJUSTMENT ON A CELL WHICH DOES NOT GAS ON CHARGE.**

Final working specific gravity should be 1.285 at 30 deg C.

**Note:** \* The correction factor to be applied for variation of specific gravity with temperature . Add 0.007 to the observed reading for every 10 deg C above 30 deg C to obtain the corrected reading at 30 deg C.

- Subtract 0.007 from the observed reading for every 10 deg C below 30 deg C to obtain the corrected reading at 30 deg C.