

B. Checking Acid Level and Acid Density of Battery

1. Check acid level and acid density.

Replenish the missing liquid with clean, distilled water. Do not measure acid density immediately after topping up with distilled water. Check acid density only after a short period of operation.

Use only a clean glass vessel and a glass funnel for the topping up with distilled water. For acid level above top edge plates, refer to Job No. 15-0. Small quantities of distilled water can also be filled up with the hydrometer (Figure 15-40/2).

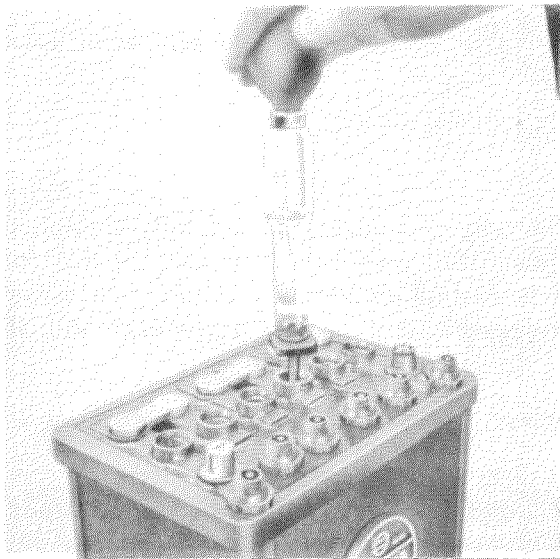


Figure 15-40/2

Note: Do not use an open light or flame near the battery. There is danger of explosion due to the formation of oxyhydrogen gas.

2. Determine charge of battery by measuring the acid density. In order to determine the density of the acid suck the acid out of the battery with an acid tester (hydrometer). The specific gravity of the acid is indicated by the float swimming in the acid. A fully charged battery should give a specific gravity of $1.285 = 32^\circ \text{ Bé}$ at an acid temperature of $+20^\circ \text{ C}$ to $+27^\circ \text{ C}$ (Figure 15-40/3).

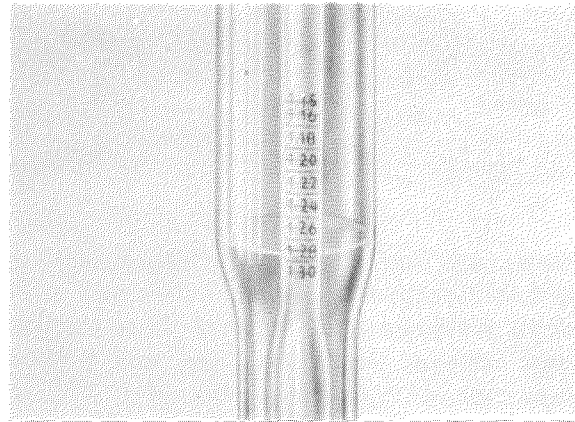


Figure 15-40/3

3. For specific gravity of battery acid in relation to the charge of the battery, see Job No. 15-0.

C. Testing Capacity of Battery

The individual cells of the battery are tested with a suitable cell tester. These instruments are equipped with a fixed resistance or even with an adjustable resistance, so that the cells can be individually tested at a high amperage (usually 200 Amp.). For accurate testing the load should correspond to the size of the battery and should be adjusted by means of an adjustable resistance. For practical purposes, however, it will be sufficient to use the available cell tester with constant resistance in the workshop. The loss of voltage under load of the individual cells is indicated by the voltmeter attached to the cell tester. The voltage should not drop below 1.8 Volt, if the battery is fully charged and in good condition. For the rest, follow the instructions supplied by the manufacturer of the instrument.

In general, the test should be conducted as follows:

1. Press the contact prods of the cell tester firmly against the two terminals of a cell (Figure 15-40/4).
2. After a max. load duration of 10 seconds read the voltage indicated by the voltmeter.

Note: If the battery is fully charged and in good condition, the voltage must not drop below 1.8 Volt.

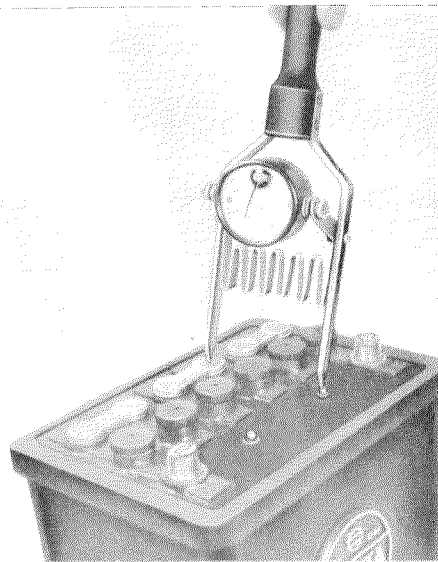


Figure 15-40/4

3. Check all cells in this way.

A more accurate test is the determination of the battery starter current load. To do this, apply a shock load at three times the amperage indicated by the battery rated capacity; after 30 seconds the cell voltage should not drop below 1.6 Volt, while at five times the amperage of the battery rated capacity the cell voltage should not drop below 1.4 Volt.

Note: For this purpose use a constant amperage tester which shows the amperage as well as the voltage simultaneously.

D. Normal Re-charging of Battery

Be sure to recharge the battery if the acid density has dropped to $1.12 = 16^{\circ} \text{ Bé}$ (in the tropics $1.08 = 12^{\circ} \text{ Bé}$), or the voltage of the individual cells has dropped to 1.8 Volt, respectively.

1. Unscrew the filler caps of the individual cells.
2. Check acid level.
If the acid level does not exceed the plates, top up with distilled water prior to charging the battery until the plates are fully covered.

Note: The separators extend beyond the top edge plates by 5 to 10 mm depending on make of battery.

3. Connect battery to charging unit. Clamp the positive cable of the charger to the positive cable of the battery and the ground cable of the charger to the negative pole of the battery.
4. Charge the battery with one tenth of the rated capacity.

Note:

- a) During the charging operation the temperature of the acid must not rise beyond 40° C (in the tropics 45° C). If the acid temperature becomes higher, the charging amperage must be reduced and the charging period extended.
- b) If the battery plates are already sulphated (indicated by a white deposit on the positive and negative plates), the battery cannot be normally charged. The degree of sulphation determines the charging current tolerated by the battery due to the changed counter-voltage. It is therefore a basic rule to charge approx. 1 % of the rated capacity with very low charging current. Increase charging current only with dropping counter-voltage.