

CHECKING BATTERY CONDITION

Periodically you may be asked to inspect batteries and determine their condition. The owner may be seeking advice on whether or not to replace the battery, or may be seeking replacement under warranty terms if he judges failure to have been premature.

You must consider several aspects of commercial behavior, and your reputation may depend upon how you deal with them. If you send away the customer with a battery which is marginal in condition you may be committing him/her to a tow or an emergency jump start which might cost nearly as much as a new battery. If you replace batteries under warranty terms without question, you may simply be condemning the new battery to a short life under abusive service conditions which ought to be corrected. Your customer deserves better.

First, examine the battery externally. Any which have cracks or holes in container, cover or vents, through which electrolyte will leak, should be recommended for replacement. The cost of replacing other components, if they have been damaged by electrolyte corrosion, could be alarmingly high and accidental injuries could ensue. Filthy batteries, wet with spewed electrolyte caused by over-topping with water, with corroded terminal posts or with low electrolyte levels indicate neglect and a use in service. Whatever replacement action you decide to take, advise the customer on the value of improving service conditions.

Next, measure the indicated state-of-charge on the battery by means of electrolyte specific gravity readings in each cell and by open-circuit voltage across the terminals. If the battery has non-removable vent caps, only open-circuit voltage readings can be used.

Determining State of Charge

| | | |
|--------------------------|-------------------------|----------------|
| 12.75 & Above | 100% | Charged |
| 12.60 to 12.74 | 85 to 100% | Charged |
| 12.40 to 12.59 | 75 to 85% | Charged |
| 12.20 to 12.39 | 50 to 75% | Charged |
| 12.00 to 12.19 | 25 to 50% | Charged |
| 12.00 & Below | Fully Discharged | |

Note: The state of charge listed is an approximation. The relationship between state of charge and voltage vary by CCA rating and case size.

If batteries have been receiving a charge current within the previous few hours, the open-circuit voltage may read misleadingly high. If open-circuit voltage reads much lower than the values given in the table corresponding to the measured specific gravities, then the battery will almost certainly be suffering an internal failure. Odd cells which show specific gravity readings .050 lower than other cells are probably internally short-circuited. Such batteries should be replaced.

Batteries which are at less than 75% state-of-charge need recharging before proceeding with any further tests. Observe that the battery does accept a charging current, even though it may be small in amperes, when the charger is switched on. See the notes on charging.

If the state-of-charge is 75% or higher, the battery should be given a high-rate load test. Typically, the high-rate load tester will discharge a battery through an adjustable carbon-pile resistance and indicate the terminal voltage as the discharge proceeds. After 15 seconds the battery voltage will not drop below a specified value if the battery is in good condition and if the current is set at about 50% of the Cold Crank Rating value. The minimum acceptable voltage reading will vary as battery temperature decreases. Read and follow the manufacturers instructions for the tester.

Batteries which have low but uniform specific gravities in each cell and which clearly require an extended recharge may have become deeply discharged through accidentally leaving open a car door overnight. It may also be the result of undercharging caused by regular driving in heavy traffic patterns or by a fault in the vehicle charging system. This may be nothing more than a slack alternator/generator drive belt, but the system should be checked out before the battery is returned to service.

Batteries which have suffered as a result of considerable overcharging may show extremely low electrolyte levels, black deposits on the underside of the vent plugs or black "tide-marks" on the inside walls of the container from about one inch below the cover. If these signs are present, the voltage regulator/generator setting must be checked and reset according to the manufacturer's instructions before a battery is returned to service. Modern car batteries in which electrolyte levels have to be adjusted frequently are clearly receiving too much charging current.