

# Modern tests for modern batteries



Frank Massey, Autoinform

The battery is one of the oldest electrical components fitted to a vehicle. Frank Massey, of ADS, believes that the motor trade has fallen behind, due to a varying degree of complacency, in understanding rapid, recent battery development and has lost opportunities in maintenance, diagnosis and repair.

**A**DS have been part of the YUASA battery testing programme for several months. I can, with a degree of shame, admit to not testing batteries as thoroughly or often as we should. The programme has helped, not just in updating our knowledge of battery technology, but has highlighted the need and opportunity in offering our customers a professional health and charge status report.

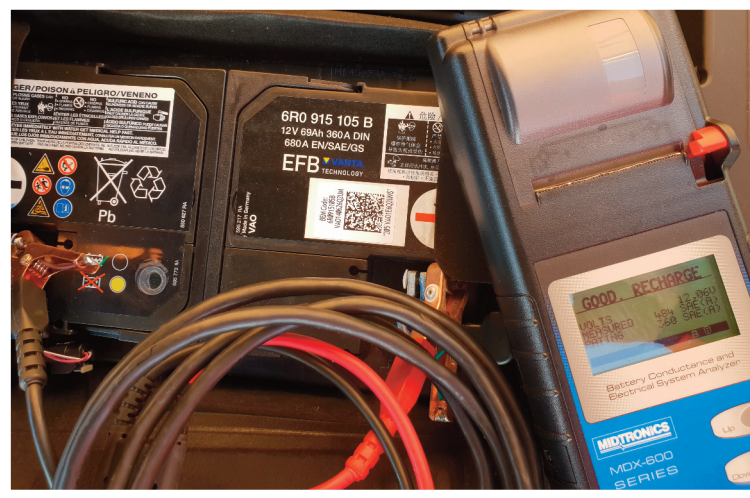
Our experience has shown that around 60% of batteries are under voltage, and sufficiently down on capacity to warrant replacing. Before you assume this is a simple sales drive, please consider how important the battery has become, its responsibility and effects on the reliability of complex network systems.

Several vehicles, especially with common rail, often have the incorrect capacity battery fitted. Customers often choose cost over application, resulting in slow rotation speeds and delayed start problems. Stop-start vehicles must have either EFB or AGM batteries, if serious damage is to be averted. Batteries fail more in winter! Hot temperatures can also cause an increase in self-discharge, so a battery can also fail in Summer,

The theoretical storage life of a battery is 3 months. With careful handling, this can be extended to 6 months. The minimum voltage should not drop below 12.6 volts. Do you check new battery voltage levels on delivery? So, what's the problem? if it's a bit low, recharge it! Each percentage drop below 12.6V will reduce the cell capacity and its service life.

A new battery will not reach full capacity until it has been formatted, as this process forces impurities off the cell surface. A battery voltage of 11.3V, or a Specific Gravity (SG) of 1.038, or less is unrecoverable. Time to scrap that battery.

The traction battery is designed to provide a high current over a short period. To convert chemical energy stored in the electrolyte cocktail,



**Modern cars demand more from batteries and garages need to make sure batteries are fit for the job**

the cells are much thinner than leisure batteries. A traction battery should be maintained with a voltage above 12.6V, or a SG of 12.55. The recovery range is 12.72 – 16.0V.

What is a budget battery? Well, I guess it's much like all budget components: you get less. You may have noticed a budget battery with the same performance rating as a premium brand. A common way of achieving this is to increase the acid strength. It may work in the short term, but acid corrosion will greatly reduce the life span.

Acid stratification is a problem often brought about in Winter when the battery charge falls below 80%. Short journeys and incomplete charge cycles, where insufficient heat is generated to reduce the internal resistance, are to blame.

Hot temperature failure is interesting. Internal battery temperatures above 60deg accelerates plate degradation. Every 10 deg rise in temperature doubles the self-discharge rate of 0.1V to 0.2V per month.

How to test a battery depends on your technical assets. The minimum of a conductance tester is required. This performs both health and charge status by applying a small proportional current through the plates. PicoScope diagnostics has a test programme that analyses voltage drop

against current consumption. Having entered the appropriate battery data and temperature, an algorithm calculates internal resistance.

Another practical test uses the 600 amp clamp, as well as monitoring voltage drop during an extended crank, non-start test. The essential observation here is to assess voltage drop against current rise times during cranking, and also observe the recovery period once rotation has been achieved. You can then calculate the engine rotation speed, and can see the average current draw.

The average current draw, multiplied by 3.5, should be less than the rated amp-hour capacity of the battery. If this calculated value is greater than the battery capacity, the battery needs to be replaced. If engine rpm's, and fuel rail pressure, do not reach required minimums, the engine may not start and the battery may need to be replaced.

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