

Introduction

This training course deals with the basic failure modes of lead acid batteries.

The object of this training course is to give you an overview of reasons for battery failure.

Additional training material specific to understanding battery failure modes is available in the why batteries fail course. This course will include additional information on the technical reasons for battery failure.

This training course consists of the following modules:

- Effects of battery quality
- Battery application to vehicle
- Service Failure Modes
- Reasons for failure under warranty

Each module has its own training video, downloadable resources and some will be followed by a short multiple-choice test.

Once you have completed all modules there will be a final test to check your understanding and knowledge.

Once passed you will earn a certificate for the completion of this course.

Module 1 - Effects of Battery Quality

OE battery manufacturers like GS Yuasa construct a battery based on the performance requirements of the OE vehicle manufacturer not on a cost basis.

Some private brand battery manufacturers limit the amount of materials used in battery construction to reduce costs.

The costliest product used in the manufacture of a battery is lead.

Lead content is reduced by using smaller, thinner and fewer plates.

The removal of lead reduces battery reliability, specification, performance and service life.

Module 2 - Battery Application to Vehicle

Battery technologies and performance specifications vary based on the demands of the vehicle starting system, electrical consumers and additional emission reduction systems.

Identifying the correct battery technology and performance specification for a vehicle is critical to ensure good battery life, vehicle system performance and reliability.

The GS Yuasa Battery Look-up systems remove the possibility of the incorrect battery being used for the required application.

They also provide a great deal of additional information to ensure that the appropriate battery is applied and is correctly installed on the vehicle.

Module 3 - Service Failure Modes

There are many factors that can affect the performance and lifespan a battery when in service.

With the exception of general wear and tear, which is a natural part of battery usage, one or a combination of adverse operating conditions can lead to premature battery failure, customer complaints and warranty issues.

As a battery ages and is subjected to wear and tear low temperatures during the cold winter months can seriously affect battery performance.

The reduced temperatures firstly reduce the ability of the battery to supply the required cranking power to start the engine and become recharged once the engine has started.

As with cold temperatures high battery temperatures can also affect its service life. High temperatures accelerate the deterioration of the internal components which reduces performance and lifespan.

Plate sulphation is natural part of the discharge process which can be reversed if the battery is recharged in a short time frame.

If left in a discharged state for an extended period the internal battery components can become permanently damaged by the sulphation process.

This permanent damage reduces the ability of the battery to become fully charged and also to produce the required cranking current.

Acid stratification is a condition that is more common in the cold winter months in batteries installed on vehicles that are used infrequently.

These conditions cause a separation of the acid and water in the electrolyte and results in the acid sinking to the bottom of the battery.

This results in battery damage that reduces life and performance in a short service time period.

Subjecting a battery to deep discharging results in excessive internal damage when recharged.

Deep cycling damage causes reduced service life, rapid loss of performance and is usually associated with use on taxis as well as delivery and constant shift pattern vehicles.

Subjecting a battery to excessive overcharging results in internal damage due to the unregulated amount of electrical energy being forced into the battery by the vehicles faulty charging system.

Overcharging damage causes reduced service life, rapid loss of performance and can be identified using some basic vehicle checks.

Under charging is when the battery receives a lower level of electrical energy than that required to reach a charged state.

This condition can be caused by infrequent use or by the vehicles faulty charging system.

Under charging results in the same internal damage, loss of performance and reduced service life caused by plate sulphation as previously described.

Module 4 - Reasons for Failure Under Warranty

Warranty failures are typically seen within a 12 month battery service period and are a result of manufacturing or material defects.

There are three common warranty battery failure modes:

- Short circuit
- Dead cell
- Open circuit

Identifying a warranty failure can be carried out using suitable diagnostic equipment such as conductance testers.

These are readily available and are capable of interrogating sealed battery types.