

GS Yuasa E-Learning Support Documentation

Lead Acid Battery H & S

Overview:

This support documentation has been designed to work in conjunction with the GS Yuasa e-learning course “Battery Failure Modes” and covers of the following subjects:

- **H & S overview**
- **Battery labelling information**
- **Hazards, precautions & actions**
- **Battery transportation, disposal & REACH**

H & S overview

Essential lead acid battery safety

The handling and the proper use of Lead Acid Batteries is not classed as hazardous providing sensible precautions are observed, appropriate facilities are available, and personnel have been given adequate training.

In accordance with the Consumer Protection Act 1987, the purpose of this guide is to indicate the main hazards which may arise, outline the precautions to be taken to minimise such hazards and indicate the emergency actions to be taken in the event of the occurrence of an emergency or accident.



Battery labelling information

Overview

Battery labels feature a range of health, safety, environmental and disposal icons.

The following symbols are used on all batteries and indicate the following:

Note operating instructions	
Eye protection must be worn	
Explosive gases	
No smoking – no naked flames – no sparks	
Sulphuric acid – corrosive and poisonous	
Contains Lead	Pb
Keep away from children	
Never dispose of as domestic waste – take to a designated waste reclamation site	
Battery is recyclable – follow local recycling & reclaiming procedures	

Note operating instructions

This icon indicates you must follow the guidance laid out in the manufacturers operating instructions before attempting to handle, operate or install the battery.



Wear eye protection

The eye protection icon indicates that suitable eye protection must be worn when handling a battery to prevent foreign objects, liquids or vapours entering the eye.



Keep away from children

This prohibitive icon instructs that children must be kept away from and never allowed access to a battery.



No smoking, naked flames or sparks

The instruction to never smoke, allow naked flames or sparks near a battery is indicated by this icon.



Explosive material

The explosive material warning icon indicates danger as the battery emits a mixture of oxygen and hydrogen gas which is an explosive risk.



Corrosive material

This icon indicates the danger posed by the acid contained in a battery. As this is corrosive, leaks in the form of droplets, spray or mist will cause burns and irritation to the skin, eyes and could seriously damage clothing.



Contains lead

The Pb symbol indicates that the battery contains lead and lead compounds which are harmful to health if ingested.

Pb

Waste lead acid batteries are harmful to the environment. This symbol indicates they should be collected separately, taken to a designated waste reclamation site and must not be disposed of as domestic waste.



Battery is recyclable

This symbol indicates waste lead acid batteries are recyclable and should be recycled following local reclamation procedures.



Hazards, precautions & actions

Electrolyte solution

Battery electrolyte contains sulphuric acid which may leak. It may also be released as droplets, spray or mist during the recharge process. Acid is a corrosive and poisonous liquid which will cause burns or irritation to the skin and eyes and can severely damage clothing. Refer to Health & Safety Executive Guidance Note EH40 for the latest occupational exposure limits for acid mist in air.

When working with batteries, you should never give children access, always handle with care, store upright, charge in a well-ventilated area, wear eye protection and protective clothing and follow all hazard and warning label icons. You should never overfill with electrolyte, allow battery vents to become blocked or attempt to open a battery case

If any acid contacts your skin immediately soak the affected area with lots of clean water, remove any contaminated clothing and seek medical attention if irritation persists. For contact with the eyes immediately irrigate the eyes for at least ten minutes with clean water and seek medical attention. If acid is ingested immediately drink as much water as possible, do not induce vomiting and seek urgent medical attention. For small electrolyte spillages wash the area with large quantities of water. For larger spillages use an acid spill kit to contain the affected area and absorb the spill. Dispose of the absorbent material in clearly labelled acid resistant containers in accordance with the environmental guidelines.

Electrical energy

There are various hazards associated with electrical energy when working with and maintaining lead acid batteries. Conductive objects such as metal tools or jewellery can create accidental short circuits of battery terminals which may generate enough heat to cause severe burns, create arcing or cause any metal to melt and splash. Severe electrical shocks may also be received from faulty charging equipment.

High voltage DC battery systems pose a further risk, as the batteries are connected in series. For example, forty 12-volt batteries connected in series deliver a total of 480 volts DC.

Always remove metal objects such as rings bracelets, watches and necklaces before working with batteries. Always take great care to avoid shorting the live terminal to earth and never place tools or metal objects near to or on top of a battery. If affected by an electrical burn apply a sterile dressing and seek medical treatment.

For electric shocks approach the affected person with care. If the individual is clear of the conductor then, with caution, switch off equipment. If the individual is still attached to the conductor do not touch with bare hands. If possible use a suitable insulated material such as wood, rubber, plastic or rolled paper, to detach the conductor from the victim. If necessary, summon medical assistance then give artificial respiration until it arrives.

When working on vehicle electrical systems always disconnect the battery. But before disconnection switch off all electrical loads and refer to vehicle manufacturer's handbook. Make the earthing point as far away from the battery as possible the first disconnection and the last reconnection when work is complete.

Gas emissions

Gas emissions produced by batteries can cause a further hazard. Hydrogen & oxygen gases are both produced during recharging. These gases may also be emitted at other times, for example, if the battery is moved or shaken. The hydrogen gas is explosive at concentration levels above 4% in an enclosed space, therefore, always store, charge and install batteries in a well-ventilated area.



To reduce the risk of sparks causing an explosion the charging leads must be correctly fitted before turning on the mains power. Switch off the mains power and wait for a minimum of 5 minutes before disconnecting the charging leads and always handle cables and connections in a way that avoids accidental sparking.

Never smoke, allow naked flames or create sparks near a battery. Also, be aware that static can create a spark of electricity that can penetrate the battery case and cause an explosion. Causes of static include removing labels and contact with man-made fibres.

If an explosion occurs acid will have been released and battery fragments may have caused severe lacerations. In this case seek medical advice appropriate to the injuries.

Battery weight

Batteries are awkward and heavy to handle therefore failing to handle them correctly can result in personal injury from acid spillage, muscle strains and broken bones. Always use the correct lifting procedures to minimise strain on the body and use the lifting handle or lifting ledges on the battery, ensuring they are correctly attached and positioned prior to lifting.



If an injury occurs when lifting seek medical advice as appropriate and remember that acid may have been spilled if an accident has occurred.

Battery repair

No attempt should ever be made to renovate or repair a damaged battery as this work involves all hazards detailed previously and should only be carried out by suitably trained personnel with appropriate facilities.

Fire

Since batteries contain combustible materials, the local Fire Authority should be consulted when a quantity of batteries are stored together.



Vehicle jump starting

Incorrectly jump starting a vehicle can result in a battery explosion, fire, burns or damage to the vehicle electrical system. It is therefore essential that the correct procedure as defined by the vehicle manufacturer's handbook is always followed.

Make sure the vehicles are not touching, the ignition in both vehicles is turned off and both vehicles are in neutral or park.

The most common procedure is to firstly connect the red positive cable to the positive terminal on the non-start vehicle battery, then connect the opposite end of this cable to the positive terminal on the jump vehicle's battery.

Now connect the black negative cable to the negative terminal on the jump vehicle's battery and finally connect the other end to a suitable earth point on the non-start vehicle, away from the battery and clear of fuel lines and brake pipes. A suitable point is the engine block.

Ensure all connections are tight and away from moving or rotating components and start the jump vehicles engine allowing it to run for one minute before starting the engine of the non-start vehicle. Allow the non-start vehicle to run for at least one minute before switching off the jump vehicles engine.

Remove the cables in the opposite order keeping them well away from any moving or rotating components on the vehicle. If any injury occurs during this procedure seek medical advice as appropriate to the injury.

Battery transportation, disposal & REACH

Transportation

The transportation of lead acid batteries is regulated by ADR, which gives guidance on the safe carriage of dangerous goods. Batteries can be considered dangerous goods because they pose a risk of fire or explosion, acid spills and unsecured load impacts.



It is the responsibility of the company transporting the battery to ensure full ADR compliance and the correct hazard signage must also be displayed on the vehicle if appropriate. To assist with this GS Yuasa, provide Material Safety Data Sheets for all products. These can be downloaded below or from www.yuasa.com.



