

	<b>MRAT 047</b>	<b>Motor vehicle batteries, electrolyte and fumes</b>	<b>Applicable to:</b> boats; cars; motorcycles	<b>See also:</b> 048
<b>Process(es) covered:</b>		The provision of an electric current at fixed voltage from a number of lead-acid cells in series. The use and maintenance of this equipment.		

### Control Measures

- Wear eye protection when handling and maintaining lead-acid batteries.
- Wear chemical resistant gloves, and aprons for the preparation of battery acid and for the filling of new batteries.
- Keep metals, including wire, and tools away from the terminals to avoid an accidental short circuit. Do not leave tools used to make or break connections to the terminals on top of a battery.
- No attempt must be made to repair a battery. This work can only be undertaken by an industry-trained person that fully understands the hazards involved.

### Immediate Remedial Measures:

Acid is splashed into the eyes	Irrigate immediately with water for at least ten minutes, holding eyelids apart. Call 111 and seek medical attention.
Acid is splashed onto the skin	Wash off immediately with plenty of water, removing any contaminated clothing.
Spilt in workshop	Ensure suitable personal protection during removal of any spill. Small spills may be swilled away with volumes of water. Alternatively, contain the spill with sand, earth or any absorbent <b>other than sawdust</b> and add sodium carbonate (soda ash) to neutralise it before scooping it into a bucket. Add water and stir, then leave to settle. Pour off the water, flushing it away down a toilet. The wet absorbent can be tipped into a strong plastic bag that is disposed of in the ordinary waste.

<b>Storage</b>	Batteries should be stored in ventilated areas. Stock acids should be stored at low level in a store where they are not likely to be kicked.
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<b>Disposal</b>	The acid may be poured slowly into a very large volume of water, neutralised with sodium carbonate (added until it stops fizzing) and flushed away. The empty battery may then be rinsed and sold as scrap for recycling
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## Risk Assessment

### Hazards:

Corrosive Fire Explosion	<p>The electrolyte used is about 34% sulfuric acid (4 M). The mist has an LTEL (8 hrs) of 0.05 mg m<sup>-3</sup> and an STEL (15 mins) of 0.15 mg m<sup>-3</sup>. The acid is classified as Causes severe skin burns and eye damage [H314]. It will also attack most clothing. During charging, the gases released will carry droplets of this acid as a mist.</p> <p>The internal resistance of lead-acid batteries is very low so a very high current will flow if the terminals are short-circuited. Sparks and molten metal may be ejected.</p> <p>Hydrogen and oxygen are emitted from a battery when it is being charged and possibly at other times, eg, when being moved or shaken. A hydrogen / oxygen mixture can produce a violent explosion if ignited and it must be assumed that this mixture is present in the immediate vicinity of the cell tops at all times.</p>
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### Risks:

Corrosive	Following the control measure will reduce the risk and keep users safe.
Fire	Following the control measure will reduce the risk and keep users safe.
Explosions	Charging should be carried out in a well-ventilated area, taking care to avoid sparks and other sources of ignition.

### Further Information:

- If it is necessary to dilute concentrated sulfuric acid to the strength required for lead-acid accumulators, it is wise to consult the technicians in the science department who will have the relevant *CLEAPSS Recipe Card*.