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Guidance Battery safety for e-cycle users Published 1 February 2024

Applies to England, Scotland and Wales

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With their ability to enable more people of all ages and abilities to cycle, or to cycle further, e-cycles are an important element of the government's ambition for active travel to make a significant contribution to the decarbonisation of the transport sector.

While most e-cycles are very safe, as with all products using lithium batteries, there is a risk of fire, particularly for counterfeit, damaged or poorly modified e-cycles and batteries, or when the incorrect charger is used.

Lithium battery fires can be particularly dangerous and hard to extinguish. The following advice should help to limit the risk of fire.

Fire safety guidance

Electrically assisted pedal cycles, or e-cycles/e-bikes, have an electric motor to help you pedal.

Riders must be at least 14, but no licence, special equipment or insurance is needed to ride one, provided that the e-cycle meets certain rules, which specify, for example, that the motor must have a maximum continuous rated power (250 watts) and motor cut-off speed (15.5 mph).

Modifying the motor or battery will increase the likelihood of a fire.

Modern e-cycles are generally powered by lithium batteries and are normally supplied with a battery charger that plugs into a normal household mains socket.

Although most e-cycles and their batteries are very safe in normal use, lithium battery packs can, particularly if of poor quality or when damaged or improperly used:

- cause serious, rapidly developing fires that are very hard to extinguish
generate toxic fumes and may cause injury or even death, alongside significant property damage to your home

This guidance comprises advice from:

- National Fire Chief's Council
London Fire Brigade, including the #ChargeSafe campaign
the UK cycle industry trade association, the Bicycle Association

Buying an e-cycle

It's safest to buy a complete e-cycle, with battery pack and charger included, from a reputable retailer.

Register your product with the manufacturer. This makes it easier to contact you in the event of a recall or safety alert.

Be especially careful when purchasing second-hand, refurbished or converted bikes. It can be hard to establish reliably whether such products are counterfeit or genuine, and whether they meet proper UK (or EU) standards. Look for CE or UKCA marking.

Buying replacement batteries and chargers

If you need a spare battery pack or charger, buy only genuine items authorised by the e-cycle or drive system manufacturer. Using a reputable supplier will reduce the risk of being sold counterfeit items. Genuine battery packs and chargers may cost more, but using third-party items that may not be safe or compatible could put your life at risk or destroy your home.

Be cautious about buying used e-cycle battery packs. Whether or not any physical damage is visible, the battery could already have been damaged or abused and pose an increased fire risk.

Buying an e-cycle conversion kit

E-cycle conversion kits are products that turn a conventional cycle into an e-cycle.

Although the concept may seem attractively affordable, the fact that the kit is retro-fitted, often by the end user, to a cycle not designed and tested for this application, means that buying a complete e-cycle is generally a safer option.

If you decide to buy an e-cycle conversion kit:

- ensure that the cycle you intend to fit it to is in good condition, able to take the additional weight and that the brakes have more than adequate stopping power
purchase from a reputable seller and a recognised brand
check that the kit complies with the UK e-cycle regulations and with British or European standards, by checking that it comes with a Declaration of Incorporation as 'Partly Completed Machinery'
be aware that if buying components such as battery packs and chargers separately, it's impossible to be sure they are compatible and safe when used together. Incompatible battery packs and chargers can cause an extremely high fire risk

DIY e-cycle kit installations have been found to sometimes result in damage to the kit, increasing the chances of battery failure and the likelihood of a fire. Note that the person who installed the kit is liable for the product's safety, even if they're a private individual, so an incident could have serious financial consequences. If possible, instead have the kit installed by a professional/competent person who is properly insured for this work.

Modifications, de-restriction and dongles

Some users may be tempted to modify e-cycles (or cycles converted into e-cycles by a kit) to exceed the speed or power limits (15.5 mph and 250 watts) for a legal e-cycle.

Users should be aware that if an e-cycle is modified to exceed these legal limits, it becomes an unregistered motorbike in law. If you use such a vehicle on the road you could face a fine and penalty points on your licence and the vehicle could be impounded. You are also unlikely to be covered by any insurance.

Even if carried out without introducing direct electrical hazards, such as short circuit risks through poor wiring/connection, modifications of this type generally increase the electrical load on the battery and drive system. These may then overheat, substantially increasing the risk of fire.

Where to store and charge e-cycles

Do not charge an e-cycle or battery pack where, if a fire breaks out, it could prevent you from safely leaving your home.

Avoid storing or charging e-cycles on escape routes or in communal areas of multi-occupied buildings.

Ensure everyone is aware of an escape plan in the event of a fire.

If possible, store and charge e-cycles and battery packs in a shed or garage separate from your home.

As far as possible, do not charge batteries or store your e-cycle near combustible or flammable materials.

If you charge or store your e-cycle inside your property, ensure you install suitable fire detection. Fire services recommend heat alarms rather than smoke alarms for garages or kitchens. Ensure you have working smoke alarms in other rooms. Avoid excessively hot, cold or damp areas, especially for charging.

Charging an e-cycle

Use only the charger supplied with the e-cycle, or a replacement authorised by the manufacturer.

Follow the manufacturer's instructions for storage, charging and maintenance of your battery pack.

Do not overcharge your battery - check the manufacturer's instructions for charge times and unplug your charger once the battery has charged.

If it's hot after intensive use, let the battery cool before charging it.

It's vitally important that you charge batteries only while you're awake and alert so that if a fire should occur you can respond quickly. Do not leave batteries on charge while you are asleep or away from the home.

Do not cover chargers or battery packs when charging as this could lead to overheating and possibly fire.

Batteries should never be exposed to extreme temperatures (keep them out of direct sunlight when not in use).

Do not overload socket outlets or extension leads. Use extension leads uncoiled and ensure the lead is suitably rated for what you are plugging into it - especially if using multiple chargers at once, or other electrical loads.

Be alert, both while charging the battery and while using the e-cycle, for any of the warning signs listed below, and know how to act if you detect a fire hazard.

Warning signs for fire risk

The warning signs that your e-cycle battery could be a fire hazard include:

- Heat: It's normal for batteries to generate some heat when charging or in use, but if it feels extremely hot to the touch, it may be defective and at risk of fire, so stop charging it immediately.
Bulging, lumps and leaks: A battery bulging or swelling out of shape is a common sign of it failing. You should stop using it immediately. The same applies if there is any type of lump or leak from the device.
Noise: Failing lithium batteries have been reported to make hissing or cracking sounds.
Smell: A strong or unusual smell (which could be toxic) from the battery could be a sign that it's failing.
Performance: Failure to fully charge, or longer charge times, can be a sign that your battery is failing.
Smoke: If your battery or device is smoking, a fire has already started. Raise the alarm, get out, stay out and call 999 immediately.

If you see signs that your lithium battery could be a fire hazard

If your battery shows any of the warning signs listed above but is not smoking or on fire:

- immediately turn off and unplug the charger
if possible, carefully move the e-cycle and/or battery pack outside away from people, pets and combustible materials or to a location where risks would be minimised if the battery were to catch fire
check for safe disposal options as detailed below or call the device manufacturer or retailer for further instructions

If the device starts smoking or catches fire:

- raise the alarm, get out, stay out and call 999 immediately
once the incident is resolved and everyone is safe, report the faulty battery to Citizens Advice in England and Wales or Advice Direct Scotland and to the manufacturer or to whoever sold the device to you

Damaged batteries

Battery packs can be damaged in use, most often by dropping them or in a crash.

Damaged batteries can catch fire rapidly and without warning. Check your battery regularly for any signs of damage. If you suspect any damage, you should replace the battery. Do not charge or use it.

Disposing of a lithium e-cycle battery

If you need to dispose of a damaged or end-of-life battery, do not dispose of it in your household waste or normal recycling. These batteries can cause fires in bin lorries and at recycling and waste centres.

The manufacturer or importer of your e-cycle may offer a free take-back service for waste e-cycle battery packs. Contact them for details or ask the retailer where you bought the e-cycle. Alternatively, check with your local authority for suitable battery recycling arrangements in your area.

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