Name of Policy	Lithium-ion battery guidance
Approval Date	Jan 2024 (reviewed through the SHW
	Committee); approved by UEB 28 Feb 2024
Revision Date	Feb 2029
Reference	SHW/GE.45

Lithium-ion battery guidance

1. Introduction

This guidance aims to establish the safe and responsible use of lithium-ion batteries within the University. The objective is to reduce the risks associated with lithium-ion batteries while promoting their efficient and effective use.

The scope of this guidance is the following:

The guidance refers to the use, recharging, storage, transport and disposal of rechargeable batteries containing salts of lithium. This guidance only covers batteries with 100 watt hours or greater capacity, and includes:

- Any University or appointed Contractor/Sub-Contractor-owned/leased equipment with lithium-ion batteries, used for purposes including teaching or research, maintenance activities etc.
- Any personal equipment brought onto University premises.

This guidance covers the following types of equipment:

- Approved transportation devices that use lithium-ion batteries such as:
 - disabled mobility vehicles,
 - electric bikes ('e-bikes' or '<u>electrically assisted pedal cycles' (EAPCs</u>) with up to 250 watt hours capacity, noting that those with 250 watt hours capacity or greater are classified as motorcycles or mopeds)
 - electric vehicles (EVs) including cars, motorcycles and mopeds with 250 watt hours capacity or greater, and plug-in hybrid electric vehicles (PHEVs).
- Any other equipment that uses lithium-ion batteries, with the exception of
 - private e-scooters and similar devices. These devices are not subject to this guidance due to their use being illegal on public roads and footpaths, and their use not being permitted on University premises. Please refer to the <u>Powered transport</u> <u>devices safety guidance</u> for more detail on these devices.
 - batteries used in personal items such as cameras, mobile phones, laptop computers, tablets, watches, calculators etc with less than 100 watt hours capacity.

Where batteries are integrated into a device, the guidance below applies to the entire device rather than the battery element alone.

Battery types

There are many types of lithium-ion battery in use, including:

- Lithium Cobalt Oxide (LCO) Typically used in mobile phones, laptops and digital cameras.
- Lithium Manganese Oxide (LMO) Typically used in power tools and medical devices but can also be found in electric motorbikes.
- Lithium Nickel Manganese Cobalt Oxide (NMC), Lithium Iron Phosphate (LFP) and Lithium Titanate (LTO)– these are typically used in e-bikes, medical devices, electric vehicles and industrial items.

2. Battery care and maintenance

For all battery-powered devices users should follow all manufacturers' guidance on battery maintenance and care. Lithium-ion batteries, even if high quality, can present an overheating risk if not used in accordance with the manufacturer's instructions. The electrolyte components within these batteries can be highly volatile and flammable leading to thermal runaway, fire and explosion caused by exothermic reaction on overheating.

This can happen for a number of reasons:

- Overcharging or incorrect usage of chargers
- Damage to the battery
- Water ingress
- Battery age
- Manufacturing defects
- Short-circuiting

Users should:

- 1. Check the condition of the battery before use and ensure no damage to the battery is evident from visual checks/failure to charge or discharge. Any damage to the battery will require the unit to be replaced immediately and not to be used under any circumstances.
- 2. Charge the battery/equipment with the appropriate charging device in accordance with the manufacturer's instructions. Incompatible charging devices may create charge fluctuations causing overheating. Visual checks of cabling/leads and the charger are recommended prior to charging. Portable Appliance Testing for University or Contractor-owned equipment should be completed on an annual basis.
- 3. Keep the battery in a dry environment free from water ingress (noting that some equipment is designed to be used in wet environments).
- 4. Ensure they have received appropriate training/guidance for the device they are using that houses the lithium-ion battery.

3. Use of batteries for University activity

All University and contractor-owned or managed equipment is subject to the Provision and Use of Work Equipment Regulations (PUWER) 1998, and their use must be fully risk assessed. This should consider procurement, training and information, general use, charging, transportation, maintenance, storage and disposal of batteries. Further guidance on risk assessment training completion can be found on the <u>Safety Health and Wellbeing</u> policies and guidance pages.

4. E-bike charging and onsite storage

Only original equipment manufacturers' (OEM) batteries or OEM-approved compatible equipment fitted by competent persons should be used with e-bikes.

Users should charge their devices prior to their journeys to site as charging on campus is not permitted. The University may consider the provision of dedicated e-bike charging facilities in future.

E-bikes must be stored in the appropriate cycle storage facility as provided on/adjacent to campus sites; they must not be stored in office areas, escape routes or other communal areas.

Ebikes are not permitted in the Halls of Residence and should be stored outside in dedicated cycle parking facilities.

5. Electric Vehicle & Disabled Mobility Vehicle charging

The University has limited onsite charging facilities at Harrow for Electric Vehicles (EVs) and Plug in Hybrid Vehicles (PHEVs), however on- or off-street charging facilities may be available close to our Central London sites. Individuals are encouraged to charge vehicles before journeys to University sites as they may be unable to charge their vehicles near/on a University site. The University will continue to monitor developments and expand its EV charging facilities where practicable. The University facilitates charging of Disabled Mobility Vehicles on sites, local Estates Planning and Services (EPS) teams will advise users on arrangements for charging at each site.

6. Battery storage

Batteries should be stored in line with the manufacturer's instructions. Extreme temperatures (exceeding 50°C or below -10°C) and storage in direct sunlight must be avoided. Batteries should not be stored fully charged for more than 24 hours.

Batteries should be stored away from combustible materials and in well-ventilated spaces. Batteries should not be stored on fire escape routes. Batteries should be purchased as needed, as long-term storage of batteries may result in natural degradation, even if stored in favourable conditions.

7. Battery failure

In the event of battery overheating resulting in fire/explosion, users must raise the alarm via the nearest manual call point and evacuate the premises in line with the <u>University Fire</u> <u>Procedure</u>. Fighting any battery fire is not encouraged due to the toxic nature of fumes, which may include hydrogen fluoride, carbon dioxide and carbon monoxide. Reignition is possible after the initial fire has been extinguished.

If a fault is noted with a battery, but the battery is not overheating, it should be removed from the device (if possible) and isolated from any combustible environment to ensure that damage is minimised should the battery ignite/explode. The local Estates and Planning Services (EPS) team must be informed immediately.

8. Disposal of batteries

The <u>Waste Batteries and Accumulators Regulations 2009</u> (as amended) must be complied with to prevent batteries being incinerated or dumped in landfill sites. Most batteries will be

classified as 'Harmful/Special waste' due to the metals and chemicals they contain. Batteries should not be disposed of with normal household/University waste.

EPS can give advice and assistance on the disposal and recycling of University-owned batteries and will have dedicated waste disposal contractors who can handle battery waste. Individuals or contractors who need to dispose of privately-owned batteries can consult their local authority who may have services available to collect batteries for disposal, or signpost to the nearest waste electrical and electronic equipment (WEEE) recycling sites. The battery recycling points found at reception or within office breakout areas must only be used for the disposal of low-capacity batteries such as those found in small personal items (eg AA or AAA, watch batteries).