

Fire Safety Guidance Note: **GN103** Guidance and principles for the charging and storage for electric powered personal vehicles

Commercial and Residential premises covered by the Regulatory Reform (Fire Safety) Order 2005

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The London Fire Commissioner (the Commissioner) is the fire and rescue authority for London. The Commissioner is responsible for enforcing the Regulatory Reform (Fire Safety) Order 2005, as amended by the Fire Safety Act 2021, (The Order) in London.

This Guidance Note provides general fire safety advice in respect of the charging and storage of electric powered personal vehicles (EPPVs) including e-bikes, e-scooters, and other similar modes of transport. EPPV is a term utilised for the purposes of this guidance note. While this guidance has been developed with consideration of the Regulatory Reform (Fire Safety) Order 2005, as amended by the Fire Safety Act 2021 (the Order) it is not building regulations guidance and does not create new legal obligations on responsible persons. Other legislation not referred to in this guidance may be applicable and should be determined by the responsible person.

This Guidance Note is produced considering our current knowledge of the risks associated with current EPPV products. The growth of EPPVs has outpaced the regulatory framework and guidance, and therefore this document will be reviewed periodically as new research on the risks associated with lithium battery products becomes available.

This Guidance Note is one of a series produced by London Fire Brigade (LFB) to provide advice on various aspects of fire safety. If you require any further guidance on the advice given or require advice on another topic, please visit the LFB website at <http://www.london-fire.gov.uk> or you can telephone or visit your local Fire Safety Office (telephone 020 8555 1200 and ask for your nearest Fire Safety Office).

1 Introduction

- 1.1 This document has been prepared by LFB's Prevention and Protection department (Fire Safety).
- 1.2 The purpose of this Guidance Note is to provide information to those storing and/or charging EPPVs (e.g., e-bikes, e-scooters, and e-unicycles) within office and residential buildings that are covered by the Order. The use of EPPVs is increasing and so too are the number of fires they are involved in. In 2018 LFB recorded five fire related incidents involving EPPVs. This has rapidly increased over a six year period. In 2022, the LFB attended 87 e-bike and 29 e-scooter fires, attributed to lithium batteries. In the first six months of 2023 LFB have attended 73 e-bike and 18 e-scooter fires, totalling 91 fire related incidents.
- 1.3 The lithium batteries in EPPVs hold a significant amount of energy and can expel this in the form of a very hot localised fire, or in some rare cases an explosion, known as 'thermal runaway', which can be difficult to control and/or extinguish. These fires or explosions can occur when the battery is damaged or charged incorrectly, or when involved in a fire which has started elsewhere. When involved in a fire, lithium batteries generate toxic gases, such as carbon monoxide and hydrogen cyanide. These are similar in appearance to steam which can mean that people are unaware of the dangers of being in close proximity.
- 1.4 This document is intended to assist the responsible person and landlords, or others responsible for fire safety in buildings. However, responsible persons should engage a competent person and/or a fire risk assessor with technical fire safety knowledge of the subject area to consider the risks and suitable mitigation and support any review of their fire risk assessment with respect to EPPVs.
- 1.5 Where fire safety deficiencies in buildings have been identified under the Order, this document is no longer applicable and further advice should be sought from a competent fire risk assessor.

- 1.6 This guidance is not intended to be exhaustive. However, it covers some of the areas of consideration that the responsible person, landlord and fire risk assessor should be addressing.
- 1.7 It is important that where consideration is being given to the storage and/or charging of EPPVs, any additional risks that might be present due to the building layout, the construction, and the occupancy of the building are all considered.
- 1.8 LFB recommends liaising with the relevant insurance provider as they may have their own requirements above that of the Order.

2 Guidance for Offices under 18m

- 2.1 It is important that where any consideration is being given to the storage and/or charging of EPPVs that any additional risks posed are fully assessed, with consideration given to the building layout. This should include consideration of how any solutions will support both the means of escape for occupants and support firefighters in both their duties to undertake search and rescue and undertake firefighting within and around the building.
- 2.2 Not all offices will be suitable to charge and/or store EPPVs, and this will need to be determined on a case-by-case basis. Consideration should be given to passive and active fire safety systems within the building, and the building layout (e.g. height, size, and complexity). A holistic approach is needed to consider the potential risks, appropriate control measures and consequences should a fire occur.
- 2.3 Where possible, EPPVs should be stored and charged in a dedicated external location. However, where this is not achievable, due consideration should be given to the provision of a separated space enclosed by suitable fire resistance to ensure that the means of escape routes are suitably protected.

When a fire occurs, it is important for people to be able to escape quickly. LFB has often seen EPPVs stored in places that block escape routes. To minimise this risk the LFB recommends:

- 2.4 Where there is only one means of escape for the building, consideration should be given to not linking any storage and/or charging facility directly into the means of escape.

It is important that firefighters attending an incident can locate and access the fire quickly and under challenging circumstances. To support this the LFB recommends:

- 2.5 Any storage and/or charging space should be located on the access level with direct external access. Consideration should always be given to access and egress routes for firefighters from the appliance (fire engine) parking position.
- 2.6 Any proposed rooms located within a basement (or lower ground or within an enclosed area of a floorplate) may require additional provisions which should be considered by the fire risk assessor, such as how attending firefighters may be supported to access and fight a fire. Existing smoke control systems conforming to the minimum recommendations of regulatory guidance may not be sufficient if they are not designed to cope with a fire on the scale of a significant lithium battery fire. This should be considered as part of the fire risk assessment.
- 2.7 Suitable directional wayfinding should be provided in accordance with *Approved Document B Volume 2 clause 5.28* and the HSE publication *Safety Signs and Signals: Guidance on Regulations*. External signage should also be provided indicating the use of the room i.e. 'EPPVs on charge'. Consideration should be given to the provision of suitable premises information and signage for firefighters to indicate positions of electric vehicle charging points, power supply

isolation controls, water supplies etc. Additional instructional signage should also be placed within the room and immediate vicinity explaining to the responsible person action to be taken in the event of a fire involving EPPVs.

When EPPVs are involved in a fire many chemicals are generated (often mistaken for steam), including many toxic gases, such as carbon monoxide and hydrogen cyanide. To mitigate the risk of this the LFB recommends:

- 2.8 If the proposed room does not contain any form of smoke ventilation, consideration should be given to the installation of a suitably sized Automatically Openable Vent (AOV) linked to the local fire detector within the room to vent any resulting fire gases.

Fires involving lithium batteries burn quickly and at extremely high temperatures. To mitigate this risk the LFB recommends:

- 2.9 Consideration of the size of the proposed room should include whether there is any automatic fire suppression system within the space. Where one is not fitted it is recommended that a localised water-based fire suppression system is installed to a recognised industry standard and is determined suitable for the specific fire risk.
- 2.10 Suitable means of raising the alarm should be provided within the proposed room which initiates early warning for occupants within the building. This should include smoke detection. Any systems should be in accordance with BS5839.
- 2.11 Enhanced structural fire protection may need to be considered to prevent structural failures due to the possibility of a prolonged lithium battery fire with a concentrated heat release rate. By their nature, fires involving lithium battery technology may involve a concentrated release of energy. Advice should be sought from the relevant insurance body.
- 2.12 Consideration should be given to water run-off and contaminated water from firefighting as fires involving lithium batteries can require a considerable amount of water.

The LFB has identified through investigations that lithium battery fires start when batteries are being charged. To mitigate this risk the LFB recommends:

- 2.13 Where multiple charging points are provided, a means for isolating the electrical supply should be sited on an external wall adjacent to the proposed storage room with clear signage as to its purpose. This should enable firefighters to isolate all electrical supply to the room of origin.

Fires involving lithium batteries often start because they have been damaged, modified or do not meet safety standards. To mitigate this risk on premises the LFB recommend that:

- 2.14 EPPVs stored on site should be well maintained by the owner. Any EPPVs that have suffered damage should not be allowed on the premises and should be assessed by a competent person before being allowed on site.
- 2.15 EPPVs should be charged in accordance with the manufacturer's instructions and only the correct chargers for battery packs should be used. The practice of removing batteries from the EPPV for charging in general circulation spaces should be avoided.

3 Principles for Residential Buildings and Offices over 18m (including offices with residential elements).

- 3.1 'Guidance Note 84 Fires in Communal Areas' published by LFB provides further information regarding a range of incidents where stored items in communal areas have been involved in a fire.
- 3.2 The Home Office guidance on [fire safety in purpose built blocks of flats guide \(Part E\)](#) expands on these issues. It recommends either a managed or zero tolerance approach to storage of any potential fire hazards in common areas because of the risk to persons being able to escape and the subsequent risk of death or injury from fire.
- 3.3 This approach is also appropriate for any shared accommodation, including flats, sheltered accommodation, houses of multiple occupation (HMOs), bedsits etc., including those which have previously been converted from a house or other use type.

4 What am I required to do as a responsible person, fire risk assessor, or resident?

Responsible person (including landlords or others responsible for fire safety in buildings).

- 4.1 The management of common parts and escape routes is essential to ensure occupants can escape safely from the premises in the event of a fire. The Order places a responsibility on the person in control of a premises, known as the "responsible person" to:
 - Carry out a fire risk assessment which must focus on the safety in case of fire of relevant persons on the premises.
 - Consider persons at special risk, such as individuals with particular protected characteristics and children.
- 4.2 The fire risk assessment must consider the means of escape in the event of fire. This will generally result in escape routes which must be:
 - Kept clear of combustibles and obstructions, including e-scooters, e-bicycles, e-unicycles, and other EPPVs.
 - Be checked on a regular basis.
- 4.3 These actions will reduce the potential for accidental fires to start and significantly reduces the risk of deliberate fires. Where necessary it may be required to enforce covenants or tenants' agreements.
- 4.4 LFB recommends that responsible persons in buildings that require remediation of the external wall construction instruct their residents that it is currently inappropriate to store EPPVs anywhere in the building until such time that the external walls have been remediated.

Fire risk assessor

- 4.5 Fire risk assessors should ensure any of the following areas are identified and recorded within the fire risk assessment, and appropriate action is taken:
 - That EPPVs are not stored/charged in common areas or escape routes, and any storage or charging within the common areas including corridors, stair enclosures, riser cupboards,

communal store cupboards, electrical intake rooms, under stair cupboards and refuse chutes, is immediately brought to the attention of the responsible person for rectification.

- Any bike storage areas and their location in relation to the means of escape, and whether charging facilities are provided or not.
- Any additional areas where gas intake pipes or cylinders may be in relation to EPPVs.
- Any designated smoking areas to be located away from bike or bin storage areas, to minimise the risk of careless disposal of smoking materials.
- Any extension leads from windows, doors or others that may indicate the possibility of charging EPPVs.
- No storage and/or charging of EPPVs on external balconies.

Resident

- 4.6 Residents can help ensure their own safety and that of others in the building by supporting your landlord in fulfilling the requirements under the Order. This includes maintaining and managing the escape routes in your building and keeping common areas free from combustibles and obstructions.
- 4.7 It is essential that escape routes and, riser cupboards in communal areas are kept completely clear of EPPVs. Nothing should be allowed to accumulate in the escape route that would hinder the safe evacuation of the building in the event of a fire.
- 4.8 There may be terms covering this in your lease and/or tenancy agreements which could lead to a responsible person taking action.
- 4.9 Further fire safety advice in relation to e-scooters and e-bikes can be found [here](#).

Heading 2

- 4.10 Text.

5 Bibliography

Detailed guidance on the various standards referred to in this guidance note may be obtained from the following bibliography. You can also obtain fire safety advice on other subjects by visiting the London Fire Brigade's website at www.london-fire.gov.uk.

The publications can be obtained from the following addresses:

AVAILABLE FROM	TITLE
http://www.london-fire.gov.uk/	Guidance Note 84 – Fires in communal areas
https://www.gov.uk/government/publications/fire-safety-in-purpose-built-blocks-of-flats	Fire Safety in purpose built flats (Section E)

The above publications are current at the time of preparation of this Guidance Note (see date in footer).