

S₂ Partnership Ltd
Intelligent Risk Management

HEALTH & SAFETY BRIEFING NOTE

ELECTRIC VEHICLES

Electric Vehicles

The UK Government has set a date of 2030 for the ban on the sale of purely petrol and diesel powered passenger cars and vans. This drive towards the replacement of petrol and diesel passenger cars / vans in the UK's vehicle fleet is leading to a significant rise in the sales of pure electric vehicles (EV's) and plug-in hybrids across the UK. This rapidly growing number of electric vehicles requires the development of new vehicle charging infrastructure across the UK to help meet the Government's 2030 target and encourage people to opt for electric vehicles.

While most electric vehicles will be charged at home overnight, the availability of 'Destination' chargers will help encourage users to make the switch to these types of vehicle and help reduce the often reported 'Range Anxiety' associated with owning electric vehicles. Additionally, many people may not be in the position to install home charging points i.e. those in flats, city centre houses with no assigned parking etc. as such availability of low cost / free public charging infrastructure at places of work or retail / leisure locations will form a key part of the overall required charging infrastructure.

While electric cars and vans are the focus of this change, we are also likely to see a rise in the use of other types of electric vehicles such as motor bikes, electrically assisted pedal cycles and scooters which may also require specific charging infrastructure.

Unfortunately, there are a number of potential health, safety and fire risks associated with providing this new infrastructure which need to be carefully considered prior to installing these charging points.

Electric vehicle charging points should only be designed, installed and commissioned by competent contractors, with particular consideration given to ensuring that electrical supply to the building / site is adequate to handle the additional potential maximum demand without overloading.



There are three main types of electric vehicle charging points, and the risks posed by these different types will vary depending on their number and location:

- Slow – typically 3-6 kW AC, these can include standard 3-pin plug charging cables, a full charge usually takes 6-12 hours
- Fast – typically 7-22kW, these are typically AC but can sometimes be by DC, a full charge usually takes 1-6 hours
- Rapid – typically 43-100kW (although even more powerful charges circa 150-350kW are starting to become available), these are typically DC but AC types are also common, an 80% charge typically takes 20-40 minutes.

Health and Safety Issues:

There are a number of general health and safety issues that need to be considered as part of installing electric vehicle charging points:

- High voltage systems – potential electric shock risks if equipment is damaged / not properly maintained.
- Vehicle impacts damaging charging stations – ensure that there is provision of suitable kerbs / bollards / barriers etc.
- Trip hazards – caused by trailing charging cables, poorly located charging stations, inadequate lighting etc.
- Vandalism / unauthorised use – provision of CCTV, access controls etc.
- Limited numbers of chargers – this has the potential to cause conflict between users as the number of EV's increases – implement suitable controls i.e., maximum charging times, parking management contractors, project plan to increase the number of chargers etc.
- Policies on allowing the charging of smaller electric vehicles i.e., scooters which may not require specific infrastructure i.e., standard 3-pin plug chargers
- Have staff / tenants been trained in the correct use of these charging points or are clear instructions available if they are available for public use.

Fire Safety Issues:

It was reported that the London Fire Brigade dealt with 54 electric vehicle fires in 2019, and 27 electric vehicle fires up to October 2020. The main cause of fires in electric vehicles is when the lithium-ion batteries become damaged, i.e: by excessive heat or the individual cells are physically damaged or pierced, this can result in short circuits which lead to significant heat generation and the potential for thermal runaway which can result in a fire (or rare circumstances explosion).

Once a fire has started in an electric vehicle these can be extremely challenging to extinguish due to the nature of the lithium-ion batteries (may require using circa 11,000 – 30,000 litres of water), and they have the potential to release a number of harmful / toxic gases such carbon monoxide and hydrogen cyanide. Additionally, even once extinguished electric vehicles have been known to catch fire again hours or even days after the initial fire has been extinguished, so additional care also needs to be taken when moving or storing the vehicle after a fire.

While most electric vehicle charging points are currently installed in external areas, there are an increasing number being installed within buildings i.e., multi-storey car parks, internal or underground car park areas etc. Therefore, the fire risks of these installations need to be carefully considered to minimise the risk of a fire starting in the first place, as well as considering the potential mitigating factors if a fire occurs, i.e: compartmentation, smoke ventilation, fire suppression systems, fire fighting access, fire fighting runoff considerations, etc.

The main things to consider where electric vehicle charging points have been installed (especially if located indoors, where there is a sleeping risk or where issues with combustible EWS have been identified) are as follows:

- The main things to consider where electric vehicle charging points have been installed (especially if located indoors, where there is a sleeping risk or where issues with combustible EWS have been identified) are as follows:
- Have the charging points be inspected, tested and maintained by a competent electrical contractor? The Electricity at Work Regulations 1989 impose duties on those who have control of premises to prevent the risk of injury from electrical systems.
- Has a suitable assessment of the risks been completed prior to allowing the installation of electric vehicle charging points in internal areas (especially if underground or there is a sleeping risk)?
- Parked vehicles or charging cables do not block or pose a trip hazard on fire escape routes, ideally, EV charging points will located be away from any designated fire escape routes / fire exits.
- Are the electrical isolation points clearly accessible / identifiable to enable power to be cut in an emergency?
- Have staff / tenants been trained in the correct use of these charging points, or are clear instructions available if they are available for public use?
- Consider the appropriate provision of portable fire fighting equipment in the vicinity of EV charging points, however, be aware that some guidance recommends non-standard extinguisher provision (i.e. Water instead of Foam or CO2 due to the additional cooling effect), however, there also needs to be awareness that provision of portable fire fighting equipment may encourage personal to fight an EV fire when this action is not appropriate. Additional training and guidance may need to be provided to site staff, contractors and tenants with regards fighting EV fires.

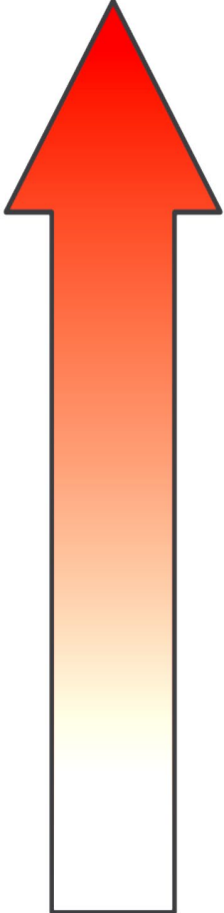
Location	Fire & security protection	Risk Level
Basement	<ul style="list-style-type: none"> • Automatic fire suppression • Ventilation • Access for firefighters • Provisions for run off of firefighting water 	
Public outdoor area	<ul style="list-style-type: none"> • Mechanical protection (kerb, bollards or barriers) for charging points • Securing point for charging cable • CCTV monitoring 	
Within building (ground floor and above)	<ul style="list-style-type: none"> • Automatic fire detection (multi sensor heads) • Automatic fire suppression system • Ventilation • Fire extinguishers • Fire compartmentation 	
Roof top level	<ul style="list-style-type: none"> • Fire extinguishers • Provisions for run off of firefighting water 	
Detached purpose-built building	<ul style="list-style-type: none"> • Automatic fire detection • Fire extinguishers • Lightweight construction (including roof) • Ventilation • Adequate separation from other buildings 	
Secure outdoor area	<ul style="list-style-type: none"> • Mechanical protection (kerbs, bollards, or rails) for charging points • Securing point for charging cable • Fire extinguisher 	

Table 1 – RC59 Recommendations for fire safety when charging electric vehicles – RISC Authority and published by the Fire Protection Association (FPA)

How can we help?

The S2 Partnership has a dedicated team of health & safety experts who can provide risk assessments, training, guidance and health & safety management systems to a range of organisations to meet legal obligations. S2 keeps abreast of the latest changes in regulations and works with clients to develop robust safety solutions, providing just the right support to each individual business to protect lives, buildings and businesses.

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We hope you find the information contained in this document helpful.

Please do not hesitate to contact us if you require any further guidance or support.

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