LITHIUM BATTERY GOOD PRACTICE GUIDE FOR CUSTOMERS

GUIDANCE

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PURPOSE

The main objective of this document is to provide guidance to customers of The Arch Company that can be used to help to prevent against the potential risks of fire, injury, and property damage arising from the commercial use of lithium batteries.

A separate document is available which provides the Arch Company policy position and instructions to employees on how the Arch Company will manage the risk of lithium batteries across the let estate.

Where lithium batteries are under our direct control, The Arch Company will ensure that all reasonably practicable steps are taken to reduce the risk of fire as low as reasonably practicable.

SCOPE

Proportionate risk management means that commercial scale use of lithium batteries is to be controlled, and this guidance sets out how that is to be achieved. Many sites will have lithium batteries present, for example in small numbers or for personal use, but this policy is not intended to apply in these scenarios although good management practices within this policy may still be applied.

Charging of a lithium battery powered vehicle away from a structure is not considered high risk provided the electrical connection is properly installed and suitably weather resistant (typically IP65 or higher).

Where charging of a vehicle or batteries takes place inside a structure, it should be noted that this is considered to have substantially more risk than if outside, and correspondingly, control measure will have to offer a higher level of protection.

In scenarios which do not readily fall into the above categories, where lithium batteries are present, please speak with property manager for more advice and a determination as to whether the guidance applies.

The charging of lead acid batteries is not covered by this guide.

GUIDANCE

What are lithium batteries

Lithium batteries are small, powerful, and lightweight power sources used in a wide variety of everyday items, from laptops to electric vehicles. They are an essential part of our lives in the modern world, and so it is important to understand their potential dangers and how they can be used safely.

Lithium batteries have the advantage of being able to store large amounts of energy in a small footprint, making them ideal for powering portable electronics. However, lithium batteries can present a hazard if they are not handled or stored properly, and the large amount of store energy can become a fire risk.

Fire risks and Thermal runway

Some common causes of fires associated with lithium batteries; the hazards and consequences are highlighted below:

Causes	Hazards	Consequences
Internal / manufacturing defect	Uncontrolled fire which is difficult to extinguish ('thermal runaway')	Fatality
Physical damage including through handling or transportation	Release of toxic gases	Risk of electrocution or electric shock
Electrical abuse including overcharging / discharging / short circuits / deep discharge	Formation of vapour cloud contributing to an explosive atmosphere	Explosive atmosphere which may not be possible to prevent igniting
Exposure to extremes of temperature	Potential for re-ignition even after apparent extinguishing	Extensive clean-up operation
	Electric energy arcing, similar to a lightning strike	Reputational damage
		Environmental contamination of watercourse

Thermal runaway

Of all of the hazards highlighted above, the principal fire risk associated with lithium batteries is the on-set of 'thermal runaway'.

Thermal runaway occurs when an area within the battery achieves high temperatures, often because of damage, manufacturing defect or excessive charging. At high temperatures, the cells within the battery begin to breakdown, which generates further heat and can lead to a very intense fire.

Lithium battery fires are often characterised by a rapid rise in temperature over a short period of time with the release of a substantial amount of energy. Once started, fires are extremely difficult to extinguish, as the battery

also releases oxygen through this process. They may reignite sometime after appearing to be extinguished.

How to control fire risks

The exact control measures which are required for each business will vary depending on the operation. It is important to determine the right controls in every case which are both workable but also effective.

This process will start with a Fire Risk Assessment (FRA), as well as health and safety risk assessments being undertaken. The focus of both of these will be on the commercial use of lithium batteries. The occupation agreement of every Arch Company customer requires these assessments to be carried out and to be documented, regardless of the number of people who are employed.

A competently produced FRA will:

- Recognise the hazards presented by the use of lithium batteries
- Identify the controls necessary to reduce the risk of fire
- Consider if those controls are in place and are effective

This table outlines some typical control measures which an FRA may recommend:

Aim of control measure	Examples of typical controls
Prevention Stopping or reducing the chances of a fire	• European CE marked or British CA marked equipment is used. • Equipment and batteries are regularly checked for damage. • Electrical Portable Appliance Testing is carried out. • The number of batteries at site is as low as possible. • Damaged and unwanted batteries are safely disposed of. • Automatic thermal cut outs to the power supply are used to prevent overcharging batteries. • Battery charging only takes place when there is someone at the site.
Protection Stopping a fire from growing or spreading	• Fire resisting cabinets are used to store and charge batteries in. • Storing and charging batteries only happens within a sterile fire-resisting room. • An automatic fire detection and alarm system is installed, for example a smoke alarm. • An automatic fire suppression system is installed.
Intervention Keeping people safe	• Staff are trained, they understand fire risks and what to do if a fire starts. • The Fire Service are told about the use of lithium batteries at site. • There are fire precautions at site, such as fire extinguishers and emergency lighting, and they work properly.

What are The Arch Company requirements?

The Arch Company expect that the following is available from all customers who use lithium batteries as a key part of their business:

a. Annual, written **Fire Risk Assessment** which identifies the risks around lithium batteries and highlights the necessary control measures. This must be produced by a competent person, and due to the specific risks associated with lithium batteries, this will require membership of one of the following, or a suitable accreditation:

   i. Institute of Fire Prevention Officers
   ii. Institute of Fire Safety Managers

iii. Institute of Fire Engineers
iv. UKAS accredited third party certificated company:
    - NSI BAFE SP205-1 company scheme
    - Warrington Certification (FRACS)
    - IFC Certification IFCC 0099

The above competency requirement relates only to the production of the fire risk assessment. Competency is necessary in the below requirements, but the precise requirements are not set out.

b. Annual, written **Health and Safety Risks Assessments** produced by a competent person, covering the storage, use, charging and disposal of lithium batteries, and which identifies the necessary control measures.

c. A "satisfactory" **Electrical Installation Condition Report** (EICR) produced by a competent person covering the circuits being used for charging, produced in the last five years.

d. Evidence of electrical **Portable Appliance Testing** being carried out regularly by a competent person, normally annually.

e. If there is a **commercial fire detection and alarm system**, a "satisfactory" testing and maintenance record produced by a competent person annually. The requirement for this will normally be contained within the FRA.

Where any of the above assessments, reports or results of testing show the need for remedial work or action to be taken to manage any risk from lithium batteries, the customer must confirm to The Arch Company that these have been properly carried out by a competent person. Evidence will be required to show that these have been completed properly.

Where to go for more information

Prospective customers should raise any queries with The Arch Company letting agent or a member of the Lettings team in the first instance. Technical questions may be passed to The Arch Company Safety team to allow for the fullest response.

Existing customers can speak to their Site Facilities Manager or Property Manager.