



Lithium battery good practice guidance for customers

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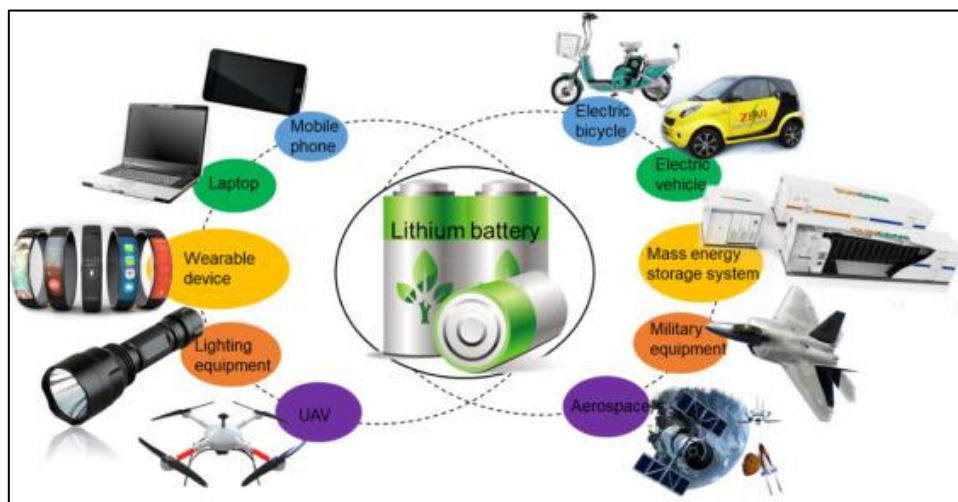
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Introduction

The purpose of this document is to provide guidance to customers of The Arch Company which will help to reduce the potential risks related to fire, injury, and property damage when using lithium batteries for commercial purposes. While lithium batteries can be used in your premises, it is important that the risks associated with them are managed.

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, so it is important to understand their potential dangers and how to use them safely.



Lithium batteries are made up of two electrodes – a positive anode and a negative cathode – separated by a thin layer of electrolyte. When a lithium battery is in use, the electrons flow through the electrolyte between the two electrodes, creating an

electrical current. This current is used to power the device to which the battery is connected.

Lithium batteries have the advantage of being able to store large amounts of energy in a small size, 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 stored energy can then become a fire risk.

Fire risks

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

Causes	Hazards	Consequences
<ul style="list-style-type: none"> Internal / manufacturing defect Physical damage including through handling or transportation Electrical abuse including overcharging / discharging / short circuits / deep discharge Exposure to extremes of temperature 	<ul style="list-style-type: none"> Uncontrolled fire which is difficult to extinguish ('thermal runaway') Release of toxic gases Formation of vapour cloud contributing to an explosive atmosphere Potential for re-ignition even after apparent extinguishing Electric energy arcing, similar to a lightning strike 	<ul style="list-style-type: none"> Fatality Risk of electrocution or electric shock Explosive atmosphere which may not be possible to prevent igniting Extensive clean-up operation Reputational damage Environmental contamination of watercourse

Thermal runaway

Of all 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 starting.

Lithium battery fires often involve 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. The fire may reignite a long time after appearing to be extinguished.

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How to control fire risks

Each business requires specific control measures depending on its operation. Finding the right controls that are workable but effective is important in every case.

This process will start with a Fire Risk Assessment (FRA), as well as health and safety risk assessments being undertaken. The focus of both 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	<ul style="list-style-type: none">• European CE marked or British Kite 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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.

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The Arch Company policy

While the risk from lithium batteries can be minimised in most businesses, the risk is greatest in cases of commercial use. Many sites may have lithium batteries present in small numbers or for personal use. In cases where the use is minimal, the risks associated with their use may be considered low and may not require any additional controls. Where customers use lithium batteries commercially as a key part of their business, The Arch Company expect that the following actions will be completed:

- 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 the:
 - i. Institute of Fire Prevention Officers
 - ii. Institute of Fire Safety Managers
 - iii. Institute of Fire Engineers
 - iv. UKAS accredited third party certificated company:
 - a. NSI BAFE SP205-1 company scheme
 - b. Warrington Certification (FRACS)
 - c. IFC Certification IFCC 0099
- 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.

If any of the above assessments, reports or test results indicate the need for remedial work or action 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 in a timely fashion. We will require you to show evidence that these have been completed properly.

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Where to go for more information

Prospective customers should discuss any queries with The Arch Company letting agent or a member of the Lettings team.

Existing customers can speak to their Site Facilities Manager.

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