

BE BATTERY SAFE CONTROL AND CONTAIN







LITHIUM-ION BATTERY FIRE RISKS. WHAT EVERY BUSINESS NEEDS TO KNOW...

Lithium-ion (Li-ion) batteries feature in almost every part of our daily life. They power our smart phones, personal devices, laptops, e-bikes and e-scooters, electric vehicles and more.

However, in the event of malfunction, they can also represent a serious fire risk.

In 2023, the London Fire Brigade reported a notable increase in the number of fires involving lithium-ion batteries, particularly in e-bikes and e-scooters. Through the year, their firefighters attended 183 incidents, an increase of more than 50% compared to the previous year. 155 of those fires were e-bike fires, and 28 were e-scooter fires. In addition to this, 11 people were killed in fires caused by e-bikes in 2023, according to data collected by Office for Product and Safety Standards (OPSS)².

In the UK, Lithium-ion batteries in domestic and business waste are responsible for an estimated 201 fires a year. That's 48% of all waste fires costing the UK economy £158m per annum.

What goes wrong?

Whilst catastrophic Lithium-ion battery failures are relatively rare, when they do occur, they can be extremely serious. Small and lightweight, when charged, Li-ion cells store a large amount of energy and are especially sensitive to high temperatures.

If a battery degrades, gets hot, or suffers a short circuit, heat and pressure build up inside. At a certain level, the



chemical reaction creates thermal runaway, causing rapid overheating and quickly affecting adjacent cells. Batteries will spontaneously ignite, burning at extremely high temperatures, releasing flammable hydrogen and other toxic gases during and after the event. In certain situations, cells may even explode.

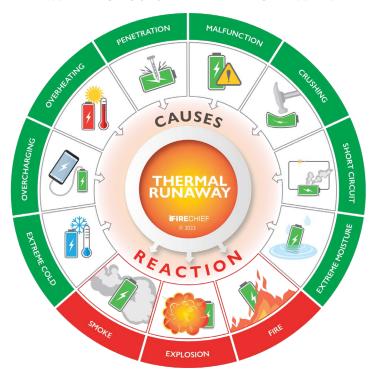
Suppressing Lithiumion battery fires

The use of a highly flammable organic electrolyte makes Li-ion battery fires very hard to extinguish. Li-ion cells release oxygen as the temperature rises, further fuelling combustion.

When managing lithium-ion battery fires, containment is a key strategy to prevent the fire from spreading further. There are multiple containment methods that can be used, from specialist extinguishers to battery fire blankets. Another innovative containment solution is Firechief Pyroflow™, a glass granulate that melts around a battery during a thermal event. By encasing individual battery cells, Pyroflow™ can break the chemical reaction of thermal runaway & therefore prevent propagation of the fire.



WHAT CAUSES THERMAL RUNAWAY?

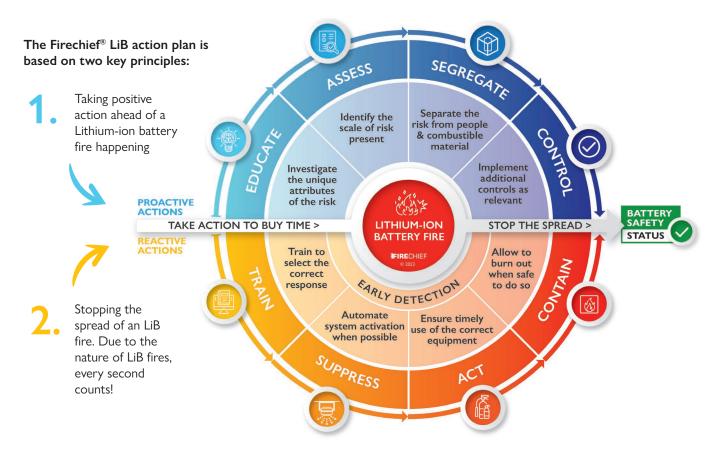


^{1.} One lithium battery fire every two days: London Fire Brigade issues new warning for e-bike and e-scooter fires | 2. 'Unexploded bombs': call for action after 11 deaths in UK due to e-bike fires |

3. Eunomia and the Environmental Services Association (ESA): Cutting Lithium-ion Battery Fires in the Waste Industry, Jan 2021



THE FIRECHIEF® HALO™ - 8 STEP BATTERY SAFE **ACTION PLAN**



The Firechief® Halo™ consists of 8 steps split into two parts. Above the line are the proactive actions that you can take ahead of time to prevent an LiB fire.

The second part of the plan shown below the line are recommended reactive actions to take in the event of an LiR fire



STEP 1: EDUCATE

LiB fires have unique attributes and are not like other types of fire. Education and awareness is an important first step in your action plan. Our Firechief® Academy offers a range of accredited CPD courses that cover the risks, causes and effects of Lithium-ion (LiB) battery fires. Scan the QR code to find out more information.









Fire Safety legislation requires that the Responsible Person (RP) of a premises takes reasonable steps to reduce the risk from fire. This includes training employees on preventing and fighting fire. This is especially important with LiB fires which have unique attributes and are unlike other types of fire.



STEP 6: SUPPRESS



STEP 2: ASSESS

The second step is to get a competent person to undertake a Lithium-ion battery fire risk assessment specific to your site and risks. For more information on how to appoint a qualified Fire Risk Assessor visit the Institution of Fire Engineers (IFE) website Fire Risk Assessors (FRA) Register (ife.org.uk)



STEP 3: SEGREGATE

see pages 4-5



STEP 4: CONTROL

see pages 6-8



STEP 7: ACT



STEP 8: CONTAIN

see pages 13-17







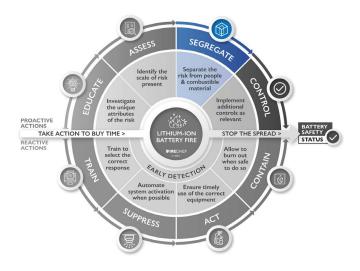
Mineral-based fire suppression agent for metal fires and Li-ion batteries

Firechief® PyroFlow™ is a new and environmentally friendly suppression agent made from expanded glass granulate. Available in 12kg (55L), 2kg (10L) and 1kg (5L) options, it can be used for preventative fire protection and firefighting where Lithium-ion batteries are present. The small, lightweight spheres consist of foamed recycled glass containing tiny internal pores which form a partially closed cell structure. Since the granulate is 100% mineral based, it is not combustible.

How does Firechief[®] PyroFlow[™] work?

Using Firechief® PyroFlow™ as a packaging media means that in the event of a battery fire, the PyroFlow™ melts to form glass which is caused by the high temperatures released by such an incident. In the process, the granules absorb a lot of heat as they melt thus cooling the fire and at the same time forming an impermeable shell around the fire load encapsulating it from further reaction.





- Thermally stable packaging filler for Lithium-ion batteries
- · Smother, suppress and encapsulate
- Easy to use
- Non-toxic and eco-friendly
- Free flowing



MODEL: PFP12 CODE: 142-1000

MODEL: PFP10 CODE: 142-1007

MODEL: PFP5 CODE: 142-1006





FIRECHIEF® PALLET COVERS

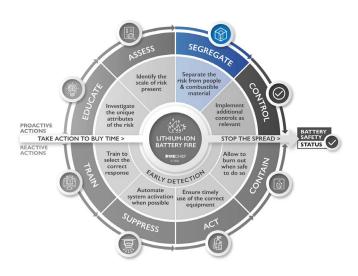
Shield your palletised goods and warehouse from lithium-ion battery fire hazards with our custom-fit fire protection pallet covers!

Made from fire-resistant material, these pallet covers act as a barrier against potential ignition sources in warehouses, storage facilities, and transportation. They control and suppress flames in their early stages, preventing fire spread and reducing the risk of smoke and toxic gas inhalation, especially during lithium-ion battery fires.

Simple to apply, they come in a range of sizes to perfectly fit your specific pallets and stacked goods height, offering enhanced fire safety and peace of mind.



Various sizes available, contact the Sales Team to find out more.



- Made from high performance fibreglass and polymer construction tested in accordance with BS EN 13501-1:2018
- · Early stage suppression
- Performs at temperatures up to 1300°C (peak)
- · Easy to use
- Minimises smoke & toxins
- Customisable sizing & easy to use







FIRECHIEF® FIRE RESISTANT BATTERY BAG

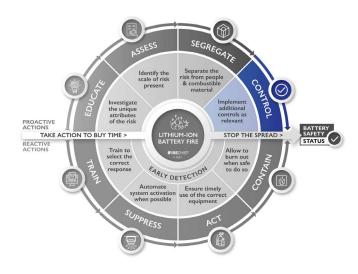
Enables easy transportation of batteries with advanced fire safety features

Our Firechief® Fire Resistant Battery Bag has been specifically designed to accommodate 2 x Robattery 71.01 (Robel E3 Range) batteries, making it a perfect match for those in the transportation and logistics industry who require the safe and secure transportation of these batteries. The bag's construction is robust and durable, specifically designed to withstand regular use, and provide peace of mind.

Featuring a bright yellow exterior and multiple layers of high-performance thermal textiles, this bag provides maximum visibility and protection against fire and heat damage. The inclusion of both Velcro and buckle closures ensures your batteries stay securely in place during transportation. The flame arrestors also provide added protection, containing potential flames while allowing the free escape of gases, preventing further damage.

Our Firechief® Fire Resistant Battery Bag also comes with a comfortable shoulder strap, allowing for easy and comfortable transportation of your batteries. With this product, you can transport your Robattery 71.01 batteries safely and effortlessly, knowing they are protected.





- Designed to accommodate 2 x Robattery 71.01 (Robel E3 Range)
- · Robust construction for regular use
- Yellow exterior for maximum visibility
- Uses multiple layers of high performance thermal textiles
- Incorporates flame arrestors to contain flames while allowing free escape of gases







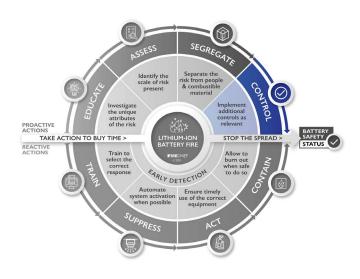
FIRECHIEF® LITHIUM-ION BATTERY ALUMINIUM STORAGE CASE - 28L

Expertly designed for the safe storage and transportation of lithium-ion batteries; aluminium storage cases are an efficient solution for protecting against the risk of fire.

The strong aluminium construction keeps the case light enough for easy transportation but strong enough to retain complete integrity should an event occur. Corrosion resistant and durable, with a convenient carry handle mounted on the lid, it can be easily lifted and carried by just one individual. Should a battery enter thermal runaway during transportation then the combination of vents fitted with flame arrestors allow for the controlled release of pressure without the risk of ensuing flame.

Combined with our unique 5 litre or 10 litre PyroFlowTM bags as a thermally stable packaging filler, if a battery should catch fire during transportation this will melt, absorb the heat, and form an impermeable shell around the fire load - encapsulating it from further reaction. During thermal runaway a mixture of toxic gases are released which can pose a serious toxic threat, so it's essential to limit the release of these as much as possible — which PyroFlowTM will also do. If there is no reaction during transportation the bags can simply be easily stored within the case and re-used again as required.





- · High temperature resistance
- Lightweight highly advanced fire insulation materials
- · Robust industrial grade aluminium
- Top carry handle for easy one person transportation
- Vented with flame arrestors for controlled pressure release
- · Easy to use clasp fasteners
- Ideal for use with PyroFlow™
 Passive Fire Suppression
 Granules 5L and 10L bags







O CONTROL

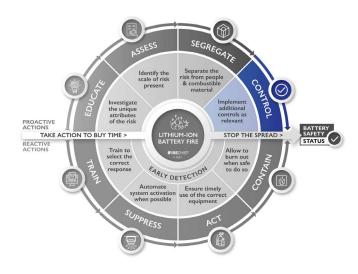
FIRECHIEF® EV SAFECOVER™ KIT

As electric vehicles (EVs) become increasingly common, towing services face new challenges. Unlike traditional cars, EVs pose a unique risk due to their lithium-ion batteries, which can self-ignite even days after an accident. This is where the Firechief® EV SafeCoverTM Kit steps in, offering a solution specifically designed for safe towing and storage of damaged EVs.

The kit includes two specially designed fire blankets to serve as a preventive measure for towing services and workshops, ensuring safety during the transportation and storage of damaged electric cars.

By incorporating the Firechief® EV SafeCover™ Kit into their operations, towing services can operate with greater confidence, knowing they have the necessary tools to manage the specific risks associated with electric vehicles. This translates to enhanced safety for both towing crews and the general public, while promoting sustainability through its eco-friendly design and reusability.





- Made from eco-friendly materials and designed for multiple uses, reducing environmental impact
- Set consists of two blankets and an optional protective fleece
- Performs at temperatures up to 1300°C (peak)
- · Large enough to accommodate SUVs or vans













8000, 11000, 12000 SERIES – FIXED INSTALLATION

The consequences of a fire can be devastating for any business. Replacement costs, consequential damage and interruption to the business can result in endangering its survival. PyroCloudTM Fixed fire suppression units detect fire at an early stage and will extinguish it in just a few seconds.

PyroCloudTM units can be installed inside a compartment, room or enclosure, providing protection as close to the source as possible. They have a fully automatic and independent system of activation and do not depend on electrical power supply but can easily be connected to conventional fire detection systems if required.

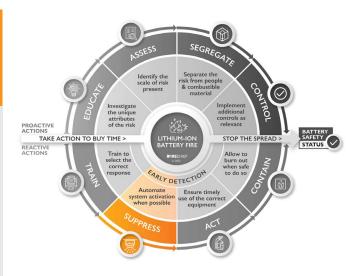
These fixed fire suppression units can be installed quickly and easily without any interruption of ongoing processes and can be deployed in places with an ambient temperature ranging from -40°C to +75°C with humidity up to 98%.

They are guaranteed for a serviceable lifetime of at least 15 years.

How does it work?

PyroCloud™ units can be installed inside a compartment, room or enclosure, providing protection as close to the source as possible. They have a fully automatic and independent system of activation and do not depend on electrical power supply but can easily be connected to conventional fire detection systems if required.





FEATURES

- · Easy to install and low maintenance
- Eco-friendly
- Cost-efficient
- Fully certified
- · Ideal for numerous applications

Typical applications:

- Electrical Cabinets
- Archives
- Storage Rooms
- Generator & Engine rooms
- Computer & Server rooms
- Transport & Construction Vehicles
- Compressor Rooms
- Wind Turbines









5000 SERIES - MANUAL **OPERATION**

Fighting fully developed fires can result in flashovers or backdrafts. The PyroCloud™ 5000 Series of manual fire suppression units knock down flames and drop the temperature to a manageable level within 30 to 60 seconds. Flashovers and backdrafts are prevented, significantly increasing the safety of firefighters when tackling an indoor fire.

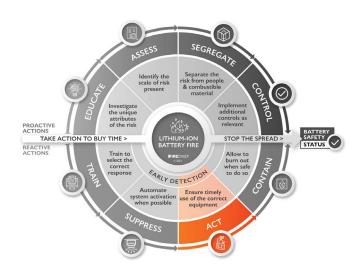
PyroCloud[™] 5000 units are small and light and easy to store on site or any fire truck or smaller vehicle. They are the perfect fire-fighting tool when water supplies are low or difficult to reach and considerably reduce water damage by suppressing the fire before entry to the affected room.

Deployed quickly and easily - even by a single first responder – without entering the room, PyroCloud™ saves crucial time and money by preventing damage of equipment and property and spread of the fire to other rooms.

How does it work?

PyroCloud[™] manual fire suppression units knock down flames and drop the temperature to a manageable level significantly increasing the safety of firefighters when tackling an indoor fire. The units are small, light and easy to store. Deployed quickly and easily – even by a single first responder – without entering the room, PyroCloud[™] saves crucial time and money by preventing damage of equipment and property and spread of the fire to other rooms.





- Easy to install and low maintenance
- **Eco-friendly**
- Cost-efficient
- **Fully certified**
- Ideal for numerous applications







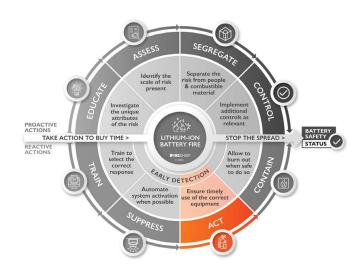


High performance extinguishers designed to stop Lithium-ion battery fires fast.

Firechief[®] Lith-Ex extinguishers are designed to suppress Lithium battery fires in their infancy before developing into a fully established fire. They can also be used to protect against fires where batteries are stored or charged.

How do Firechief® Lith-Ex extinguishers work?

Firechief® Lith-Ex extinguishers contain Aqueous Vermiculite Dispersion (AVD), a revolutionary fire extinguishing agent. The water content of the extinguisher cools the fire source, while the Vermiculite platelets encapsulate the fuel source creating a thermal barrier to prevent propagation of the fire.



FEATURES

- Kitemark approved (FLE2, FLE6, FLE9)
- Designed for use on Lithium-ion battery fires on batteries with a power rating from 50Wh - 1000Wh
- Quickly cools excessive heat, preventing re-ignition
- Lightweight and compact
- Non-toxic and environmentally friendly

WHICH LITHIUM-ION EXTINGUISHER DO I NEED?









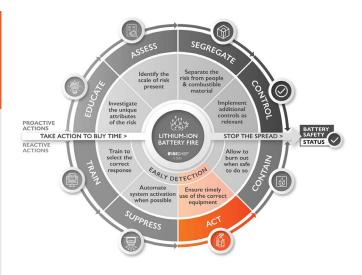
Mineral-based fire fighting agent for metal fires and Lithium-ion batteries

Firechief® PyroFlow™ is a new and environmentally friendly suppression agent made from expanded glass granulate. Available in 17kg (55L), 3kg (10L) and 1.5kg (5L) options, it can be used for firefighting and preventative fire protection. It contains tiny internal pores which form a partially closed cell structure. Since the granulate is 100% mineral based, it is noncombustible.

How does Firechief[®] PyroFlow[™] work?

By covering the fire load with Firechief® PyroFlowTM, oxygen is separated from the combustible material. Firechief® PyroFlowTM melts to form glass caused by the high temperatures released by such an incident. In the process, the granules absorb a lot of heat as they melt, thus cooling the fire and at the same time forming an impermeable shell around the fire load, encapsulating it from further reaction.





FEATURES

- · Mineral-based fire fighting agent
- Smothers and cools Li-ion battery fires
- · Easy to use
- Non-toxic and eco-friendly
- Free flowing









MODEL: PFA17 CODE: 142-1001 MODEL: PFA10 CODE: 142-1009 MODEL: PFA5 CODE: 142-1008





FIRECHIEF® LITHIUM-ION BATTERY FIRE RESISTANT CONTAINER

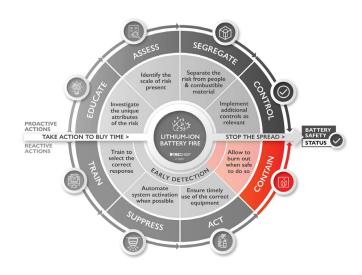
Designed for safe storage and transit of Lithium-ion battery packs, fireworks and flammable chemicals

The Firechief® Lith-ex Fire Resistant Container (FRC) is an innovative product that protects potentially flammable goods against the threat of fire. The exceptional insulation properties are achieved by the use of a unique combination of technical textiles which prevent the propagation of both internal and external fires.

The Fire Resistant Container provides the perfect solution for transporting and storing potentially combustible products, such as batteries, fireworks and other flammable chemicals.

The FRC works in several ways:

- Contains a fire within the bag (e.g. burning batteries on a plane)
- Prevents fire spreading to adjacent material
- Gives extra time for responders to get the risk under control or people to escape
- Prevents an external fire igniting a vulnerable/ flammable cargo



- Temperature tested to 1000°C
- Safe storage and transit of Lithium-ion battery packs, fireworks and flammable chemicals
- Insulates and isolates to contain /prevent the spread of fire and heat
- · Flame arrestors included









FIRECHIEF® CAR FIRE BLANKETS

Firechief®'s Car Fire Blankets are flame retardant and contain any type of car fire within seconds.

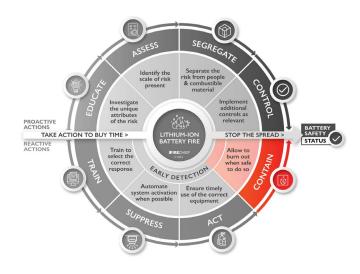
Suitable for use on most cars, including SUVs and off-road cars, they are manufactured from fibreglass and covered with a polymer on both sides. For safety reasons, they incorporate 6 grips for correct placement and the intervention of at least 2 people is recommended.

The Firechief® Car Fire Blanket includes a textile storage bag for easy transportation and storage.

In vehicle fires, the fire blanket, reduces toxic waste gases and suffocates the fire as quickly as possible, preventing the fire from spreading to other vehicles, buildings, and structures.

Ideal for storage and transportation in our Firechief® Fire Safety Equipment Wheeled Cabinet - see page 15.





- · Large 6x8m blanket size
- Suitable for all cars, SUV's and manual handling equipment
- Performs at temperatures up to 1300°C (peak)
- High performance fibreglass and polymer construction
- Durable textiles storage bag







FIRECHIEF® FIRE SAFETY EQUIPMENT WHEELED CABINET

Firechief® Fire Safety Equipment Wheeled Cabinet, brings convenience and efficiency to emergency situations.

Engineered for seamless manoeuvrability and swift access, this front-loading cabinet ensures that essential safety equipment is readily available when every second counts

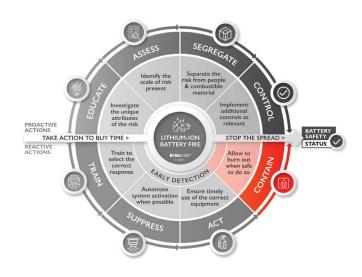
With a spacious internal capacity of $915 \times 360 \times 195$ mm, it offers ample storage for large fire extinguishers, fire blankets (including EV size), and other essential safety gear.

Constructed from fully recyclable PE, the Firechief® Fire Safety Equipment Wheeled Cabinet ensures exceptional durability, promising reliable performance even in demanding conditions. Its robust rubber wheels and convenient handle make transportation effortless, allowing you to move vital equipment from one location to another with ease.

The toggle access feature ensures quick and hasslefree retrieval of equipment during critical moments, empowering responders to act swiftly and decisively.

Please note that assembly of the wheels and handle is required, ensuring straightforward setup and customisation according to your needs. Experience the next level of safety and efficiency with Firechief® Fire Safety Equipment Wheeled Cabinet designed to meet the demands of modern emergency response.





- Excellent solution for storing and deploying large fire extinguishers, fire blankets (including EV size) and other essential safety equipment
- · Made from fully recyclable PE
- · Strong and durable
- Equipped with robust rubber wheels and a convenient handle
- Easy to manoeuvre
- Toggle access guarantees quick and hassle-free retrieval of equipment







FIRECHIEF® PREMIUM BATTERY FIRE BLANKETS

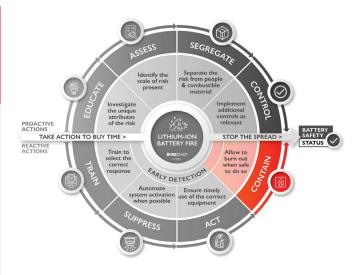
Premium Lithium-ion battery fire blankets for everyday safety.

Lithium batteries fuel our modern world, but their potential to overheat and ignite poses a real safety threat. Thankfully, Firechief® Lithium-ion Premium Battery Fire Blankets offer a simple, accessible solution for peace of mind. These specially designed blankets act as a powerful barrier, containing the fire and preventing flames from spreading. They withstand extreme temperatures (up to 1300°C), significantly reducing the risk of burns, toxic fumes, and debris associated with lithium-ion battery fires.

Lightweight and easy to use, these blankets are ideal for various applications. Whether you're dealing with consumer electronics, industrial equipment, or even military systems, you can find a customised solution to fit your specific battery needs. Their convenient packaging and clear instructions ensure they're readily deployable in an emergency, offering valuable seconds during critical moments. Remember, while essential, fire blankets are not a replacement for proper battery handling and safety practices. However, by incorporating them into your safety protocols, you gain an invaluable layer of protection, providing peace of mind and potentially saving lives.

BLANKET SIZES AVAILABLE	
BFB/S 104-1090	1.55 x 1.55m
FBB3M 104-1092	3 x 3m





- Withstand temperatures of up to 1300°C
- · Lightweight and easy to use
- · Reduces chemical risks and the spread of toxic fumes
- Multiple size options
- · Adaptable and cost-effective







FIRECHIEF® LITHIUM-ION BATTERY FIRE SUPPRESSION KITS

Designed for the safe suppression and removal of extinguished Lithium-ion battery devices.

The Firechief® Fire Suppression Kit is the perfect solution for the effective control and suppression of Lithium-ion battery fires. Equipped with a choice of Lith-Ex extinguishers, this fire-resistant bag is designed using technical fabrics to withstand temperatures in excess of 1000°C.

The kit provides the initial extinguisher to suppress the fire and a bag for the safe suppression and removal of the extinguished device. Typical applications are mobile phones, tablets and laptops.

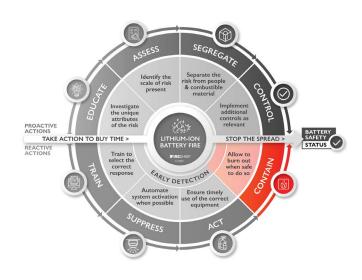
Both kits include:

- Fire resistant bag (the large kit also comes with flame arrester)
- Choice of Lith-Ex extinguisher options or the kit can be supplied without an extinguisher if preferred
- Safety Gloves
- · Safety Glasses



To find out the various options available, visit our website





- Suppression bag for safe storage of extinguished devices
- Reduces the risks of explosion after the fire has been extinguished
- Withstands temperatures in excess of 1000°C





HOW TO MITIGATE THE RISK OF A LITHIUM-ION BATTERY FIRE

PREVENTATIVE MEASURES:

- Treat lithium-ion batteries and the devices which contain them, with the respect they deserve. Protect the batteries against being damaged through crushing, puncturing or immersion in water as this increases the risk of fire
- Always use the charger that came with your device. If you need to buy a replacement, choose a branded, genuine product from a supplier you can trust
- Avoid storing, using, or charging lithium-ion batteries at very high or very low temperatures
- Don't leave items continuously on charge after the charge cycle is complete, e.g., don't leave your devices plugged in overnight
- Battery experts recommend that a good charging range is from 20 percent up to 80 percent and then recharge from 20 percent back to 80 percent. Lithium-ion batteries don't perform well when they are constantly charged from 1-2% up to 100% and back again
- Ensure that wherever you charge a device, you still have a clear exit from the room or property in case of fire
- Never charge a device such as a mobile phone under items such as pillows. Lithium-ion batteries need to be kept within a good temperature range, with good circulation of air around them. Always charge them on a hard surface
- When you travel, avoid keeping all your items containing lithium-ion batteries together, especially on a plane

CONTAINMENT MEASURES:

- Stop using the battery and/or charger if the temperature of either (or both) rises more than 10°C (18°F) on a regular charge.
- If a Lithium-ion battery overheats, hisses, or bulges, immediately move the device with the battery away from flammable materials and place it on a non-combustible surface. If at all possible, put the battery safely outdoors to burn out.
- Bear in mind that moving a battery which has gone into thermal runaway can cause re-ignition and the combustion process to start again for up to 10 hours after it started. Specialist products such as the Firechief® Premium Battery Fire Blanket help to stop the spread and contain the fire.





CPD ACCREDITED COURSES

Are you aware of the dangers of Lithium-ion battery fires?

Is your workplace optimised to mitigate the risk of them?

Do you want to learn more through a CPD-accredited course?



FIRECHIE



Scan QR code for more details



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