LITHIUM-ION
BATTERY SAFETY RANGE

FIRECHIEF®
making the world a safer place

PRODUCT GUIDE

BE BATTERY SAFE - CONTROL AND CONTAIN

Proven results on Lithium-ion batteries

Suitable for various applications

Environmentally friendly products



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firechiefglobal.com

LITHIUM-ION
BATTERY SAFETY RANGE



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 2021, the London Fire Brigade attended 104 fires involving Lithium-ion batteries: 44 caused by e-bikes, 28 caused by e-scooters and 32 other Li-ion battery events including mobile phones and laptops.[1] The Brigade's data for 2020 also suggests the fire incident rate for electric cars is 0.1%, more than double that for petrol and diesel vehicles.[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.[3]

What goes wrong?

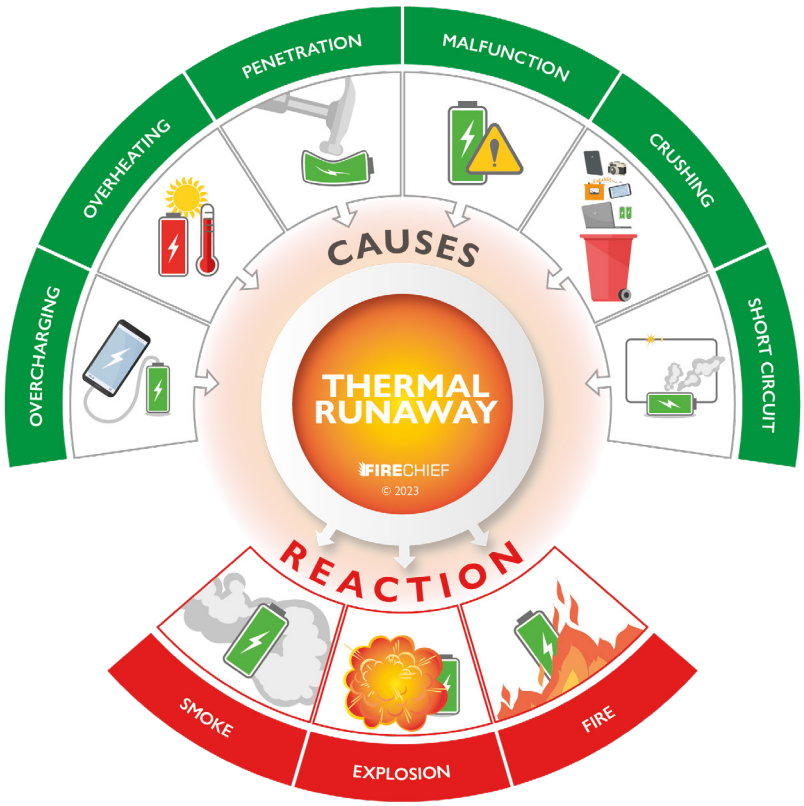
Whilst catastrophic Lithium-ion battery failures are relatively rare, when they do occur, they can be extremely serious. Small and lightweight, when charged Li-ion cells store a large amount of energy and are especially sensitive to high temperatures.

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 Lithium-ion 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.

The only effective way to suppress Lithium-ion battery events has been to use Firechief Lith-Ex Aqueous Vermiculite Dispersion (AVD) extinguishers. By discharging a fine mist of Vermiculite particles suspended in water, a spray both cools and forms a heat-proof barrier around the burning battery cell to prevent propagation and re-ignition.



Organisations and environments at risk include…

- Emergency Fire and Rescue Services
- Courier services and Logistics providers
- E-scooter/e-bike OEMs and retailers
- Transport operators and passenger hubs
- Recycling centres and consumer recycling points
- Battery Electric Vehicle OEMs and retailers
- Device OEMs
- Aerospace OEMs

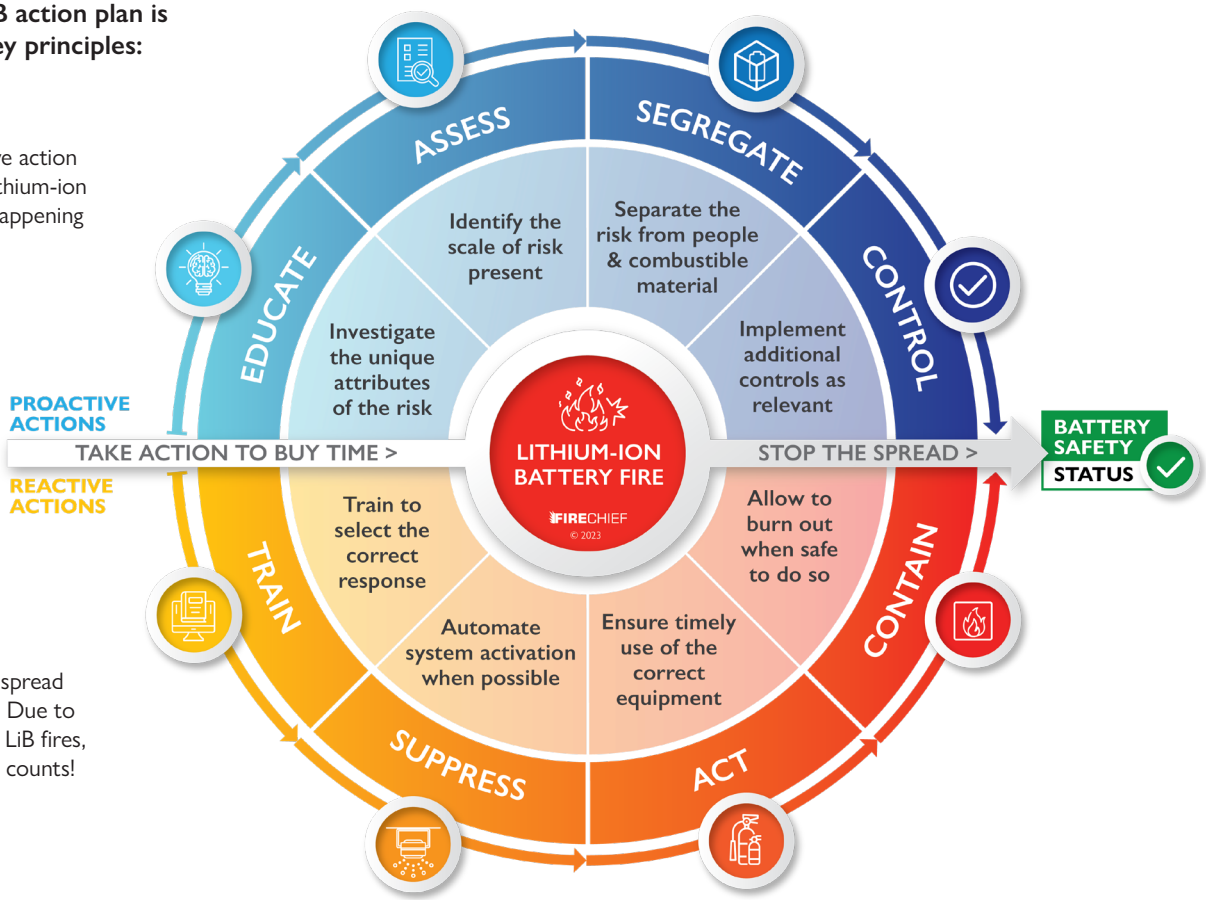
Sources: 1. London Evening Standard / 2. Fleet News / 3. Eunomia and the Environmental Services Association (ESA): Cutting Lithium-ion Battery Fires in the Waste Industry, Jan 2021

THE FIRECHIEF 8 STEP BATTERY SAFE ACTION PLAN

The Firechief LiB action plan is based on two key principles:

1. Taking positive action ahead of a Lithium-ion battery fire happening

2. Stopping the spread of an LiB fire. Due to the nature of LiB fires, every second counts!



The plan 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.

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. There is plenty of information available online at (batteryfiresafety.co.uk) and on the Battery University website (batteryuniversity.com)

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 page 4

STEP 4: CONTROL see page 5

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

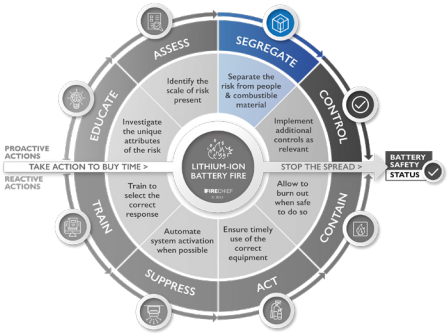
STEP 5: TRAIN

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 see page 6

STEP 7: ACT see pages 7-9

STEP 8: CONTAIN see pages 10-14



PYROFLOW PASSIVE FIRE SUPPRESSION GRANULES

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. 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.

FEATURES

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

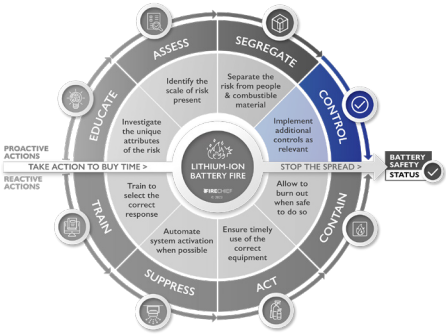


To find out more, download the product sheet

SCAN ME



MODEL: PFP12
CODE: 142-1000



FIRECHIEF FIRE RESISTANT BATTERY CARRIER

Enables easy transportation of batteries with advanced fire safety features

Our Firechief Fire Resistant Battery Carrier 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 carrier's construction is robust and durable, specifically designed to withstand regular use, and provide the peace of mind.

Featuring a bright yellow exterior and multiple layers of high-performance thermal textiles, this carrier 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 Carrier 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.

FEATURES

- 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



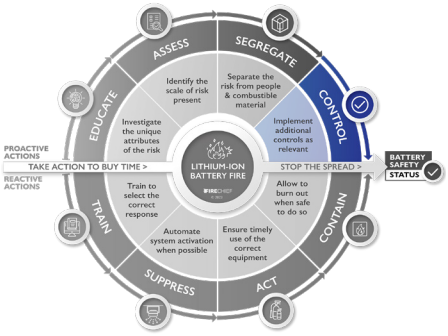
MODEL: FRBC1
CODE: 141-1062



To find out more, download the product sheet

SCAN ME

CONTROL



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

FEATURES

- **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**

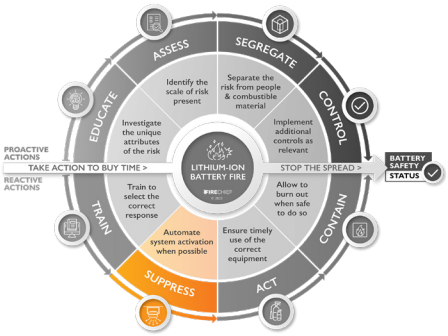


To find out more, download the product sheet

SCAN ME



MODEL: FRC/AVD
CODE: 141-1041



PYROCLOUD™ FIRE SUPPRESSION

PYROCLOUD 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. PyroCloud Fixed fire suppression units detect fire at an early stage and will extinguish it in just a few seconds.

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.

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

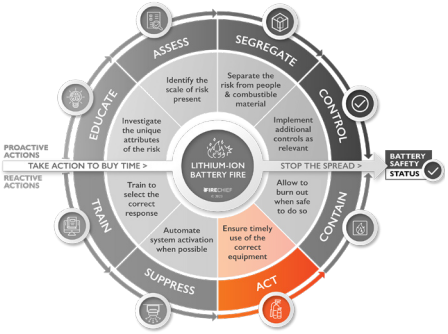


To see the full range, visit our website

SCAN ME



MODEL: SSS8001
CODE: 141-1042



PYROCLOUD 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.

FEATURES

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



MODEL: SSS5003
CODE: 141-1008

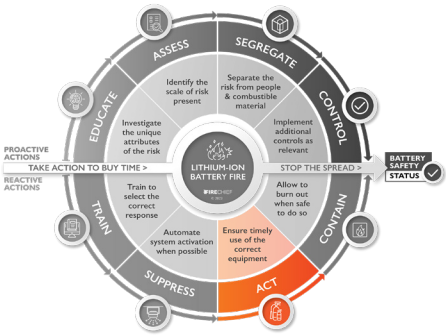


To see the full range, visit our website

SCAN ME

MODEL: SSS5000
CODE: 141-1005

ACT



LITH EX®

EXTINGUISHERS

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?

APPLICATION	BATTERY CAPACITY (WH)	EXTINGUISHER SIZE	RATING	MODEL / CODE
Small Devices	Under 60	500ml	-	FLE500 / 100-1587
Home & Leisure	60-100	1Ltr	3A	FLE1 / 100-1576
Workshops	100-250	2 Ltr	5A	FLE2 / 100-1577
Battery Storage	250-500	6Ltr	13A	FLE6 / 100-1578
E-Scooters & E-Bikes	500-750	9Ltr	13A	FLE9 / 100-1579
E-Vehicles & Fire Services	Under 750	25Ltr	-	FLE25 / 100-1649
Energy Services	Over 750	50Ltr	-	FLE50 / 100-1648

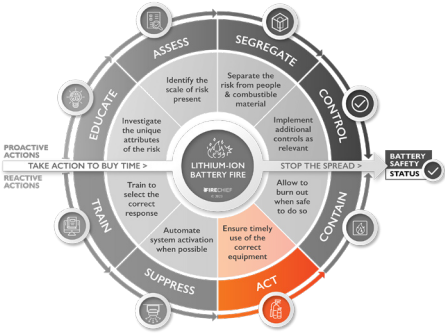


To find out more, download the product sheet

SCAN ME







PYROFLOW ACTIVE FIRE SUPPRESSION GRANULES

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. 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 non-combustible.

How does Firechief PyroFlow work?

By covering the fire load with Firechief PyroFlow, oxygen is separated from the combustible material. Firechief PyroFlow 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

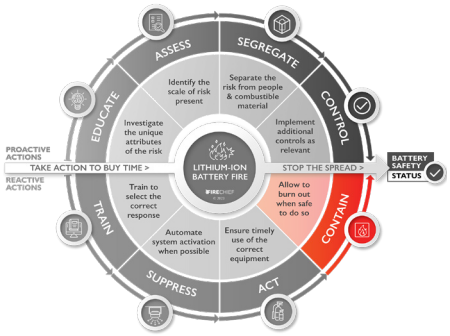


MODEL: PFA17
CODE: 142-1001



To find out more, download the product sheet

SCAN ME



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

FEATURES

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



MODEL: FSKS500
CODE: 141-1039

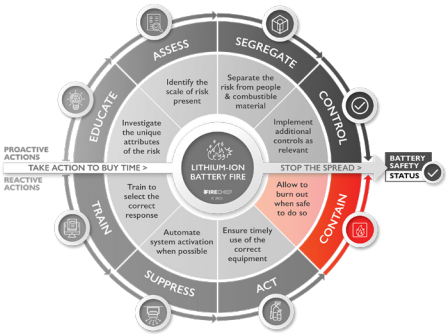


To find out the various options available, visit our website

SCAN ME



MODEL: FSKL2000
CODE: 141-1035



FIRECHIEF PREMIUM BATTERY FIRE BLANKET

Designed for use with Li-ion battery packs

Firechief Premium Battery Fire Blankets are capable of withstanding extremely high temperatures in an oxidising atmosphere for a prolonged period of time as well as being robust enough to offer protection against potential debris and shrapnel expelled during a battery fire event.

The Firechief Premium Battery Fire Blankets are manufactured using fire resistant technical fabrics based on the highest temperature resistant silica glass fibres.

Flame deflection protection is added to these fibres as well as abrasion resistance utilising a variety of proprietry surface coatings. The non-flammable, vermiculite dispersion mineral-coated glass fabric is overlaid with a sacrificial protective silicone layer.

Testing has been completed on exposed Lithium-ion batteries up to 840 Wh.

Heat/Fire Resistance Testing

1000°C
No rupture of the fabric after several hours of application of either a point flame source or in a constant temperature furnace.

1200°C
No rupture after 30 minutes.*

1500°C
Rupture after 10 minutes.*

* The base fabric is fully oxidised and will not ignite. When subjected to temperatures above the stated operating temperature for an extended period of time, the fabric will exhibit localised degradation and become brittle

FEATURES

- Working temperature up to 1000°C
- Provides safe storage and protection in transit
- Fire resistant technical fabrics
- Fire resistant reinforced multi-layered edge lining
- Handling loops on all corners

WHICH SIZE BLANKET DO I NEED?

APPLICATION	BLANKET SIZE	MODEL / CODE
Scooters, tools, IT equipment	2x1.7m	PBB1 / 104-1085
E-Bikes, mobility scooters	3.3x2.6m	PBB2 / 104-1086
Cars, forklift trucks, manual handling equipment	8x6m	PBB3 / 104-1087



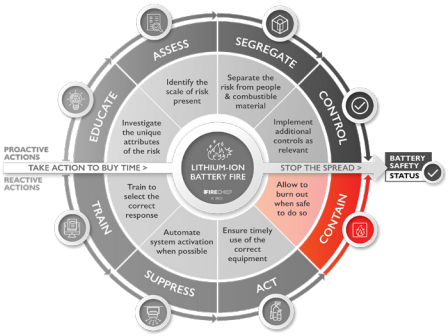
MODEL: PBB2
CODE: 104-1086





To find out more, download the product sheet

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FIRECHIEF SINGLE USE CAR FIRE BLANKET

Firechief's car fire blanket is flame retardant and designed to extinguish fires in motor vehicles and to control flames and smoke in electric vehicles. It is manufactured from fibreglass fabric and covered with a polymer on both sides.

With an area of 6 x 9m. (54m^2) this blanket will cover most cars in case of fire, including SUV's and off-road cars. For safety reasons, it incorporates 6 grips for its correct placement. The intervention of at least 2 people is recommended. It can be placed and deployed in less than 10 seconds. The car blanket weighs approximately 28 kg.

Car fire blanket includes a textile storage bag for easy transportation and storage.

FEATURES

- Large 6 x 9m blanket size
- Suitable for all cars, SUV's and manual handling equipment
- Performs at temperatures up to 1200°C (peak)
- High performance fibreglass and polymer construction
- Durable textiles storage bag

SUITABLE FOR

- Outdoor parking
- Underground car parks
- Commercial centres
- Hotel car parks
- Car rental companies
- Mechanical workshops
- Firefighters
- Ferries
- Port services
- Car dealerships
- Insurance companies

Fire Equipment Chest

Alternative storage suggestion for advanced weather protection

MODEL: HS100
CODE: 106-1071





To find out more, download the product sheet

SCAN ME



MODEL: CFB1
CODE: 104-1088

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.






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making the world a safer place

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LITHIUM-ION
BATTERY SAFETY RANGE

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