BURTON SECURITY

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Safe charging of lithium-ion batteries

How to prevent battery fires and protect your business

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Why this whitepaper?

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Understand the risks, regulations, and proven solutions

Lithium-ion batteries are compact and powerful. They are used in countless devices: e-bikes, tools, forklifts, delivery scooters, and much more. But during charging, they can become dangerous. An overheating battery may suddenly ignite. Within seconds, a room can fill with dense smoke, temperatures rise rapidly, and in some cases, an explosion may follow.

Key risks include:

Damage
to your building and inventory

Danger
to employees

Business
interruption

Potential insurance
complications

Many organisations still charge batteries at random power sockets or inside old, unsafe cupboards scattered throughout their buildings. Perhaps this sounds familiar. You know something needs to change, but you may not yet know where to begin.

Insurers see the same trend. As a result, they are introducing stricter requirements for how and where lithium-ion batteries are stored and charged. This white paper explains what to look out for, and which solutions have been proven to work.

Contents

Check out the playlist!

Battery fires

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Lithium-ion batteries: increasing use, increasing risk

Global use of lithium-ion batteries is rising quickly. More tools, devices and vehicles depend on them, from smartphones and power tools to electric vehicles and e-bikes. In many countries, e-bikes in particular have surged in popularity: in some regions, almost half of all new bicycles sold are electric, and ownership continues to rise.

As use increases, so does the risk of fire. Fire brigades and insurers across Europe report a growing number of battery-related incidents. In the Netherlands, lithium-ion batteries were likely the cause of 5% of all residential fires in 2024, up from 3% in 2023, according to the Dutch Association of Insurers. Similar trends are being observed across Europe and beyond.

Most of these fires are linked to unsafe charging practices, such as charging indoors, in hallways, or near escape routes. E-bike batteries are frequently involved. The risks are often underestimated, until it is too late.

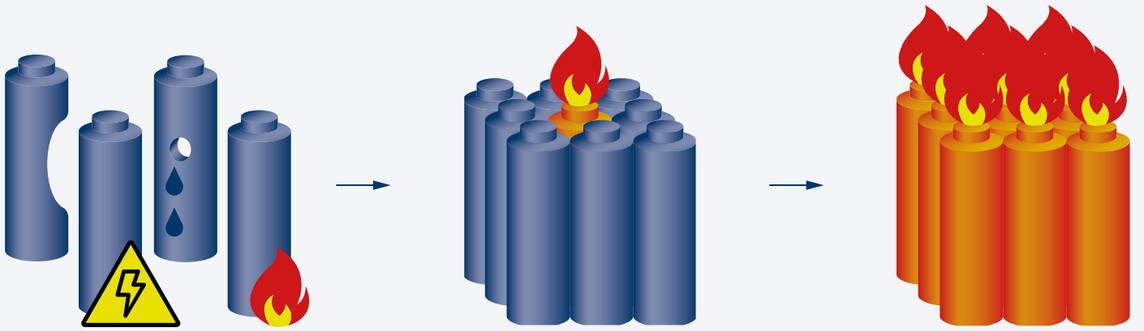
Watch the video of a battery fire in a holiday home

Why lithium-ion batteries are so dangerous

A lithium-ion battery stores a large amount of energy in a compact housing. That makes it highly efficient, but also vulnerable. A fall, impact or faulty charger can cause internal damage, leading to a short circuit. This may trigger ***thermal runaway***: an uncontrollable chain reaction where heat builds rapidly, potentially resulting in fire or explosion.

Often, this damage is invisible from the outside. The risk is even higher with second-hand batteries or batteries of unclear origin, for example those from shared bikes or used tools.

Thermal runaway in brief:

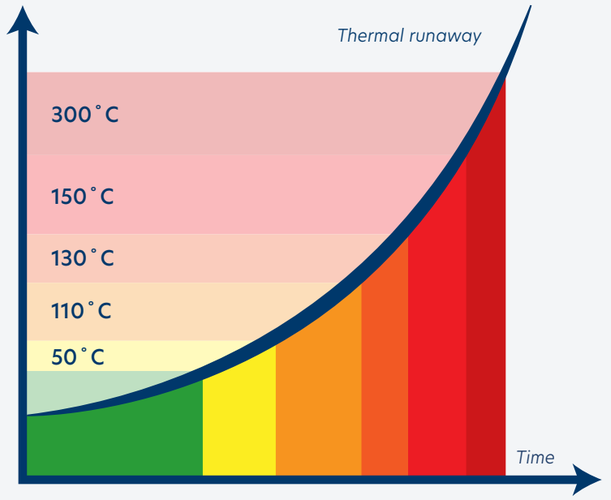


A damaged cell ignites

A chemical chain reaction accelerates the fire

The fire becomes uncontrollable

Temperature rise during a thermal runaway



How battery fires start, and how to prevent them

Most battery fires occur during charging, often at times or in places where no one is present to intervene. Typical high-risk situations include:

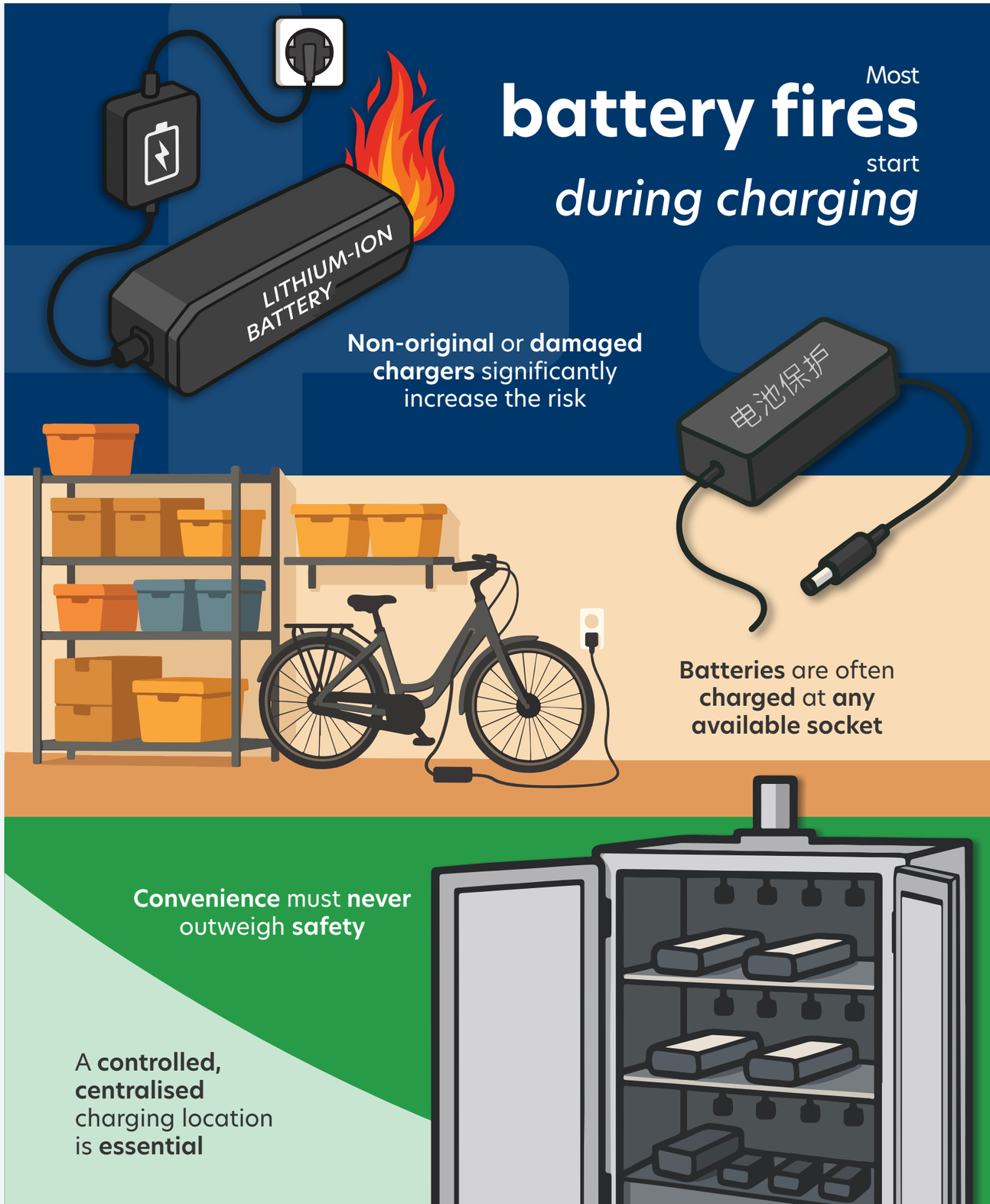
- Overnight charging without supervision
- Charging in rooms containing flammable materials
- Ad-hoc charging in convenient but unsafe locations

Non-original or damaged chargers significantly increase the risk. In many workplaces, batteries are charged at any available socket. But convenience must never outweigh safety. A controlled, centralised charging location is essential.

> *I live above the shop with my family. That's why we now have a battery safe.*

Rob Hendriks
Owner of Bike Totaal Thijs Hendriks

Watch the story of bike mechanic Bike Totaal Thijs Hendriks



Certified battery safes

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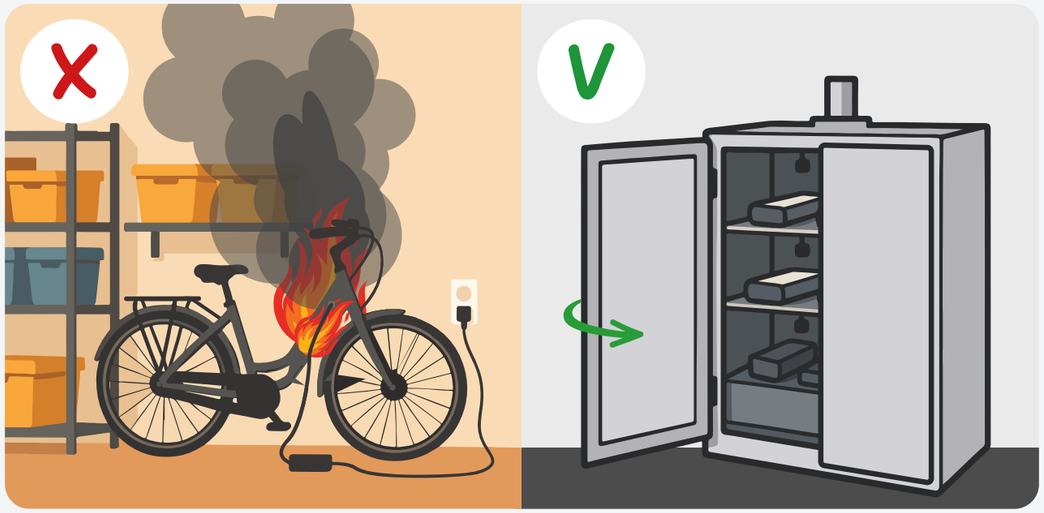
The most reliable way to limit damage in battery fires

A burning lithium-ion battery is no ordinary fire. Within seconds you face dense smoke, temperatures of several hundred degrees, and a real risk of explosions. Extinguishing such a fire is extremely difficult.

The only reliable way to limit damage is to prevent the fire from spreading. To do that, you need a certified, fire-resistant battery safe installed in a central, controlled location. It protects your business and ensures that batteries are handled correctly:

- Batteries are always charged safely in one designated area
- Issuing and returning follow a consistent, documented process
- The correct chargers stay with the correct batteries, reducing misuse



Real-life case: e-bikeccu.nl

At e-bikeaccu.nl, batteries are sold, tested and returned daily. Returned batteries carry specific risks because their condition is often unknown. That is why the company invested in a Batteryguard battery safe.

A wise decision: one of the returned batteries caught fire during charging. Thanks to the safe, the fire was fully contained. No damage to stock, no danger to staff, and operations continued as normal the next day.

> *“Fortunately, the fire remained entirely inside the safe — nothing escaped.”*
>
> Bart van Linschoten
> *Operational Project Manager, e-bikeaccu.nl*

Watch the story at e-bikeaccu.nl

How to determine whether a battery safe really works

A battery fire doesn't have to cause serious damage, as long as the safe works as it should. But how can you be sure it will?

Only a certified battery safe, tested under real lithium-ion fire conditions, offers that level of certainty. Certification proves that the safe can contain fire, smoke and heat, and that it meets the highest safety standards.

Not all battery safes have been tested under such extreme conditions. Only with proper certification can you be confident you're choosing proven protection.

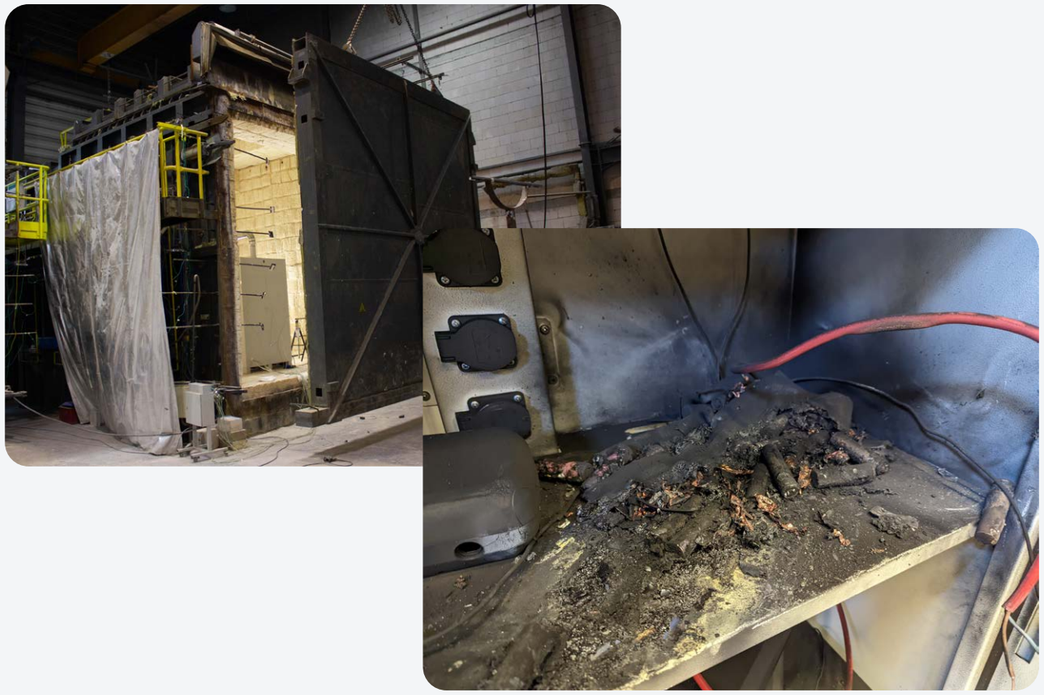
VDMA 24994: tested on battery fires

The VDMA 24994 test is currently the only method that truly demonstrates how a battery safe performs during a lithium-ion battery fire. It's not a simulation or theoretical model, but a practical test involving fire, smoke, heat and blast pressure. During the test, a lithium-ion battery is intentionally set on fire inside the safe.

The test confirms that:

- The doors stay closed, even under blast pressure
- Smoke, flames and heat remain fully contained
- The external temperature stays below 150 °C

Only battery safes that pass this test are eligible for ECB-S certification under VDMA 24994, clear proof of real, tested protection.



Practical tip

Look for the blue ECB-S plate, usually found inside the door. It confirms that the battery safe has been tested and certified.

ECB-S (European Certification Body) is the only recognised authority in Europe that certifies safes specifically for battery fire protection.

Regulations

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VDMA 24994: independently tested, reliable and certified

Only two accredited laboratories, MPA Dresden and GryfitLab, are authorised to carry out the VDMA 24994 test. They operate under strict protocols and are supervised by the European certification body, ECB-S.

This gives you:

- Independent proof of safety
- Confidence when dealing with insurers or inspection bodies
- Assurance that you meet the highest safety requirements

ECB•S MPA Dresden GRYFIT LAB

Batteryguard battery safes are officially tested according to VDMA 24994 and have achieved the corresponding ECB-S certificate.

Watch the story of Roompot parks

Case study: Roompot

Roompot rents ebikes and e-choppers at more than 100 parks. To reduce risks, the company chose one clear solution: central charging locations with Batteryguard battery safes.

The batteries are no longer charged in holiday homes, but at a safe location, out of guests' reach. Also the battery safe is tested for battery fires. This way smoke and fire remain inside, and business operations remain unthreatened.

What about EN 14470-1?

You may have encountered EN 14470-1, a standard often mentioned for battery cabinets. However, this standard was originally developed for storing hazardous materials such as paints and solvents.

EN 14470-1 assumes the fire starts outside the cabinet. But with lithium-ion batteries, the fire normally starts inside, due to damage, overheating or short circuits.

Furthermore, EN 14470-1 does not require real-life testing with actual battery fires. By contrast, VDMA 24994 includes live tests with lithium-ion fires, smoke and blast pressure.

Feature	EN 14470-1	VDMA 24994
Origin	European standard	European test requirements
Developed for	Paints and solvents	Lithium-ion batteries
Fire scenario	External fire	Internal battery fire
Test type	Theoretical models	Practical fire tests
Blast pressure tested?	✗ No	✓ Yes
Doors during fire	May open	Must remain closed

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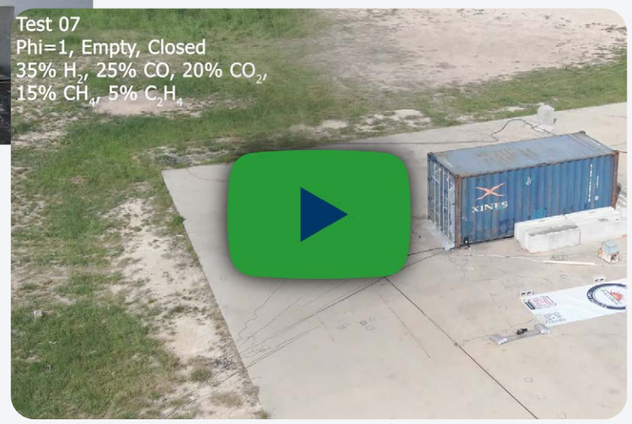
> *Many companies assume a standard cabinet is sufficient. But with a battery fire, you only discover whether it works when it's already too late. A battery safe must be tested and certified, otherwise you are taking unnecessary risks.*

Jos Kools
Product Specialist, Batteryguard

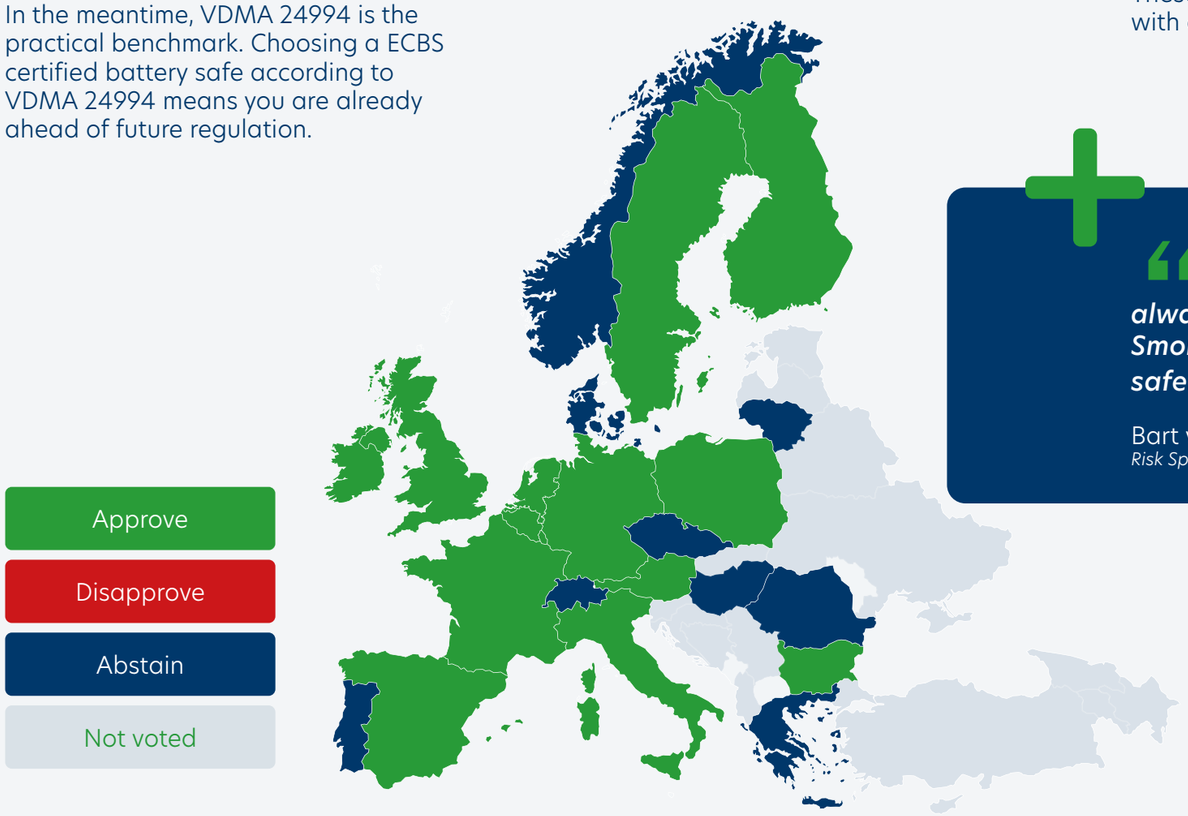


In this video you can see what happens when a battery explodes

Towards a European standard

The VDMA 24994 test is not an isolated initiative. It currently forms the foundation of a new European standard for battery storage. That standard is still under development, and EU processes take time, meaning it may take several years before it becomes mandatory.

In the meantime, VDMA 24994 is the practical benchmark. Choosing a ECBS certified battery safe according to VDMA 24994 means you are already ahead of future regulation.



What insurers require when you work with lithium-ion batteries

Insurers increasingly recognise the growing risks associated with lithium-ion batteries. Many now require certified battery safes, specifically those tested according to VDMA 24994, for both charging and storage.

These requirements are not arbitrary. They are based on years of investigations into battery fires, with one goal: protecting business continuity.

> ***"A storage unit for lithium-ion batteries must always remain closed. The door must seal properly. Smoke and flammable gases must stay inside, or be safely vented outdoors, never into the room."***
>
> Bart van de Broek
> *Risk Specialist, Nationale Nederlanden*

Watch the interview with risk specialist Bart van de Broek from insurer Nationale-Nederlanden

Your responsibility as an employer

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Battery fires are not only about property damage, employee safety always comes first.

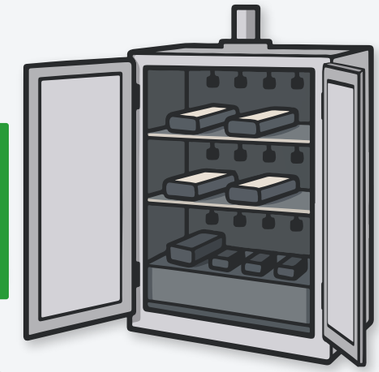
As an employer, you are legally required to provide a safe working environment. That includes recognising emerging risks, such as lithium-ion battery fires, and implementing appropriate preventive measures.

Failing to act may leave you legally and financially liable. Using a certified battery safe demonstrates that you take your responsibility seriously, and protects both your staff and your business.

Are you fulfilling your duty of care?

- V **Risk assessment**
  Have you identified and documented the risks associated with lithium-ion batteries?
- V **Clear instructions**
  Do your employees know how to store and charge batteries safely?
- V **Damaged batteries isolated**
  Are damaged or faulty batteries removed from use immediately?
- V **Certified battery safe in use**
  Are you using a certified battery safe for both charging and storage?
- V **Emergency preparedness**
  Do your employees know what to do in case of a battery fire?

Check your risk of a battery fire >



Do's		Don'ts
Inspect batteries regularly for signs of damage	V	X Charging unattended on a workbench
Use only the original charger	V	X Charging near flammable materials
Charge and store batteries at room temperature	V	X Leaving batteries connected after charging is complete

Prefer tailored advice?

Request a free consultation with one of our specialists >

About Batteryguard

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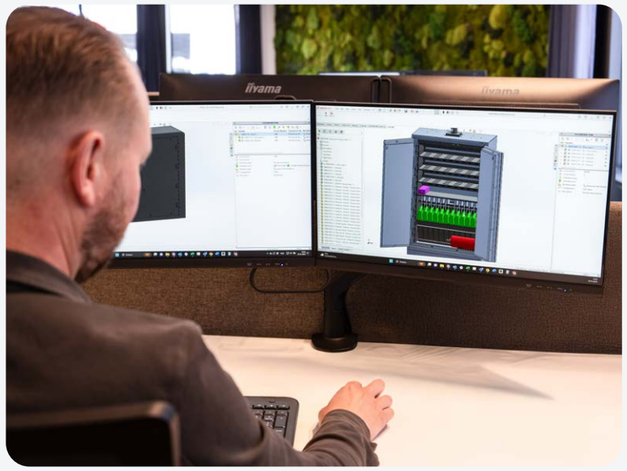
Batteryguard is a brand of Nauta Security Storage B.V., a family business with over 60 years of experience in designing and manufacturing high-quality fire- and burglary-resistant safes. This extensive expertise forms the foundation of our Batteryguard battery safes.

With a special fire-resistant safe construction and robust locking mechanism, our battery safes ensure that a battery fire or explosion is contained.

In-house development and production

Our battery safes are designed by our own R&D team, combining years of experience with the latest technologies to develop innovative solutions that meet the strictest safety requirements. We assemble the safes in-house, allowing us to respond flexibly to changing laws and regulations.



Collaboration and knowledge sharing

At Batteryguard, we believe safety starts with collaboration. Therefore, we actively share our knowledge and contribute to the development of future safety standards.

We were involved from the very beginning in developing the VDMA 24994 test and contributed actively to the European working group that designed the certification. We work closely with insurers, the European association for safes, other safe manufacturers, battery suppliers and several lithium-ion working groups. including the group developing the upcoming European standard.

Personal advice

Every situation is different, so we're happy to assist. Whether you're looking for a single battery safe or a complete, safe charging setup for multiple batteries—we offer personal advice from start to finish. From the right choice to delivery and professional installation: we've got it covered.

Contact

Want to know more? Contact our product specialists!

+ 44 01484 663388 enquiries@burtonsecurity.com burtonsecurity.com

Why choose a Batteryguard battery safe certified to VDMA 24994?

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Maximum safety

- V Certified by ECB-S according to VDMA 24994, approved by all major insurers
- V Proven to contain lithium-ion battery fires
- V Battery fires remain safely contained, ensuring no risk to employees or nearby residents

Easy to use

- V Safe charging 24/7, always have fully charged batteries ready
- V Resume operations the next day, without disruption
- V Visual and audible alerts if the door is open, a battery overheats, or a fire starts

Smart charging with ElectrIQ

- V Distributes power intelligently across chargers
- V Charges in optimised steps
- V No modifications to your fuse box required

Simple installation

- V Plug and play
- V Requires only a single standard power socket
- V No installer or rewiring needed

ECB•S

Want to know which battery safe suits your situation, or which additional options are available?

Download our brochure >

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think safe

Check out

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Contact us at
+ 44 01484 663388 or
enquiries@burtonsecurity.com