

## Better solutions in fire protection for mobile energy storage

Across all areas of life, **lithium-ion technology** has created new opportunities as a mobile energy storage device. Lithium-ion batteries dominate the market for demanding applications as they offer particularly high energy densities and a long service life. However, lithium-ion batteries also entail specific risks that pose particular challenges for personal safety and, in particular, for **technical fire protection**.

Based on our many years of experience, we develop individual fire protection solutions for lithium-ion batteries together with our customers to develop individual fire protection solutions for lithium-ion batteries, tailored among other things to the areas of

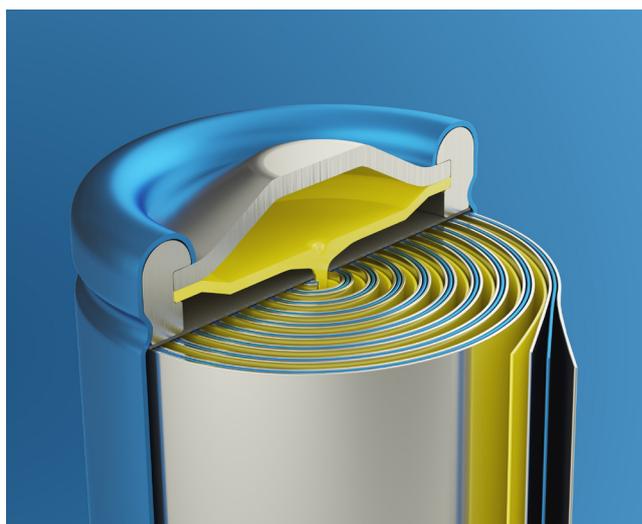
- production
- storage
- operation and
- test laboratories

## Small power packs – high risk potential

Batteries store **large amounts of energy**. If, due to technical defects or improper handling, the chemically stored energy is released in an uncontrolled and accelerated manner, this usually takes the form of **thermal energy**, which amounts to a multiple of the nominal electrochemical energy stored. This inevitably leads to a short circuit with arc and consequently to a **fire**. The release of oxygen by the battery's cathode material initiates a self-reinforcing process that leads to a **thermal runaway** (self-consumption)

and thus to an unusually rapid spread of fire. Spontaneous combustion and an associated fire of a lithium-ion battery cannot be prevented, but it can be made controllable.

Specific risks associated with failing lithium-containing batteries include chain reactions of adjacent cells, ignition of adjacent fire loads, contamination with corrosive and toxic materials, and fragments flying around as a result of explosion.



## Individual fire protection solution

### Why individual?

Today, there is a huge **variety of lithium battery types** for the most diverse applications, which differ in cathode, anode and electrolyte as well as in design, power and size. The term "lithium battery" is a collective term for the multitude of different battery systems in which **lithium** is used in pure or bound form as the **active material** of the battery

### Your partner in fire protection

We are pioneers. With our many years of expertise in technical fire protection, we accompany you through the entire process consisting of:

- project-specific **risk analysis**
- **definition of protection goals** by the customer
- creation of the **individual fire protection solution**
- installation and commissioning
- holistic support during the operating phase

During the risk analysis, among other things, the type of storage, storage density, processes, type, number and performance of the cells are examined individually and

### Application areas of our solutions

- Production (formatting, aging)
- Storage of batteries
- Large-scale energy storage
- Battery-powered systems (storage systems/charging stations, e.g. for robots, electric scooters, cars)
- Battery test stands and test laboratories

electrode. Generally valid protection concepts, e.g. when storing batteries in larger quantities, with high energy density or numerous small batteries in many packaging units, do not exist. The multitude of these factors makes an accurate statement about the concrete risk potential of a battery very complex and must be considered individually.

aligned with the protection goals required by the customer. It is important to bear in mind that suitable solutions may also require changes to processes or structural adjustments as well as **fire tests accompanied by an independent expert** as proof of effectiveness.

We understand, live and control fire. Our customers all over the world trust in this motivation and our competence – as their partner of first choice! Numerous **references** prove this.



VdS-approved System OxyReduct® system for fire prevention



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