

Interesting facts about lithium-ion batteries

Assessing the potential danger correctly



Lithium-ion batteries and their underestimated fire potential

Lithium-ion batteries are both a blessing and a curse. High energy density on the smallest storage cell represents a quantum leap and, despite the most modern technology, involves certain risks.

Fires and explosions caused by lithium-ion batteries, which are used operationally in work equipment such as drill screwdrivers, laptops, smartphones or flashlights, are increasing continuously. Larger energy storage devices, such as those installed countless times in large electrical appliances, e-bikes and e-scooters, multiply the fire potential. The higher the energy density, the higher the risk.

Usually qualitative defects, the age of the batteries, accidents, but also carelessness are the mechanical, thermal or electrical causes of fires.

Damages, temperature effects and overcharging can lead to an increase in internal resistance and at the same time, especially with high current flows, cause the temperature to rise significantly. This results in an increase in pressure inside the cell and eventually in a breakdown, possibly with fire and explosion. Thermal runaway is due to the fact that this type of energy storage uses organic solvents in the form of hydrocarbons, which react in an almost flammable manner like petrol.

In the commercial sector burning lithium-ion batteries should be tackled by fire safety assistants if possible, based on the risk assessment and the measures laid down. Fires of several or larger batteries should only be fought by fire brigade personnel!

Primary cells just as at risk as batteries

However, it is not only the batteries themselves that are affected by the increasing number of cases, but also the non-rechargeable primary cells. One of the main causes of fire is the massive overheating of one or more cells. It is basically irrelevant whether the battery is a smaller energy storage device with only a few watt-hours of power, as integrated in smartphones, or a large lithium-ion system with several kWh that ensures the operation of an electric car or forklift truck. Even the smallest defective cell is capable of calling a large fire brigade into action.

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In the process, the overheated cells „infect“ those next to them, comparable to a chain reaction. The thermal runaway of the entire battery system described above can then lead to uncontrollable temperatures as well as dangerous and very toxic gas leaks.

Flammable gases, electrolytes and other cell components

Another cause of fire is the improper, unprotected storage of defective lithium-ion batteries or their storage in so-called „unclear“ condition. Lithium-ion batteries can simply be physically damaged by mechanical impacts during transport and storage or thermal stress in terms of strong sunlight, heat or cold.

Worst case, this can lead to the escape of flammable gases or electrolyte and consequently to ignition. Overheating is usually indicated by white/grey smoke. In such a case, persons in the danger zone should never inhale this smoke, as it contains battery contents and decomposition products that are very unhealthy and corrosive. The mist that is released can subsequently ignite and cause a flash fire, which in turn can decompose other lithium-ion batteries in the immediate vicinity.

In addition to the actual fire, explosion-like processes can occur, as the source of fire can decompose into small, splinter-like individual parts that eruptively burst apart.

Caution and expertise in firefighting

The actual fire-fighting of smaller lithium-ion batteries (up to 642Wh / 1285Wh) by trained personnel requires a fire extinguisher with a particularly high cooling effect, if possible with a pre-mounted extinguishing lance to maintain a safe distance.

Professional associations such as the DGUV and the bvfa recommend water, if necessary with extinguishing agent additives, as the suitable extinguishing agent.

So play it safe and convince yourself of the new GLORIA water fire extinguishers with special suitability for lithium-ion batteries. On the following pages you will learn more about the new member of the GLORIA family with all its technical features and advantages.

In addition, you will find further information and documents on the technical specifications of the new extinguishers on our website.

If you have any further questions, please feel free to get in contact with us. Reach out to us by phone or e-mail.

