BUNDESVERBAND TECHNISCHER BRANDSCHUTZ e. V.

DGUV
Fachbereich Feuerwehren
Hilfeleistungen Brandschutz

# Safety warnings about extinguishing lithium-ion battery fires

***Burning lithium-ion batteries represent significant and unpredictable danger. Fires involving smaller lithium-ion batteries, e.g. from work equipment such as screwdrivers, laptops etc., should therefore only be extinguished by fire safety assistants on the basis of the risk assessment and the specified measures, and heeding the special operational conditions (see Section 1.2 of DGUV Information 205-023 "Fire safety assistants - training and qualification").***

***Note:*** ***Fires with multiple or larger batteries should only be extinguished by fire brigade personnel!***

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**The following safety instructions must be observed when extinguishing burning lithium-ion batteries:**

## 1 Risk assessment - STOP principle

As part of the risk assessment, the company has introduced protective measures on the basis of the STOP principle (substitution - technical - organisational - personnel as well as behavioural measures in this order; see also www.baua.de). The specifications of the respective lithium-ion battery manufacturers and their technical product data sheets or safety data sheets must be observed.

***Note:*** In terms of their informative value, e.g. suitable personal protective equipment (PPE), suitable extinguishing agents, the technical product data sheets and safety data sheets known to us are partly too general and not clear. We recommend conducting a targeted product-related inquiry and requesting written documentation.

A specific and very specific improvement on the part of the manufacturers and/or product refiners of lithium-ion batteries is urgently required.

## 2 Fire behaviour and possible hazards

Heat, overcharging or mechanical damage can cause high temperatures of more than 800 °C on the surface of the battery cells. The cell may open and eject its contents outwards under excess pressure. This can produce a white/grey smoke that contains battery components and decomposition products that are harmful to health if inhaled. Furthermore, components of burning lithium-ion batteries can be ejected with considerable energy.

## 3 Personal protective equipment - note personal risk

When extinguishing fires, adequate, adapted and suitable personal protective equipment must be used, e.g. protective gloves, protective clothing, face protection and respiratory protection. More detailed information on suitable personal protective equipment can be found in the product-specific information provided from the respective lithium-ion battery manufacturer (see note under Section 1).

***Note:*** No measures should be taken that involve a personal risk of self-harm or that have not been sufficiently practised.

## 4 Remaining in the hazard zone

The company or its authorised representatives must ensure that unprotected persons who are not required for hazard prevention refrain from entering and remaining the hazard zone (see § 9 Prohibitions on Entry and Remaining in the Hazard Zone pursuant to DGUV Regulation 1 “Principles of Prevention”).

## 5 Fire extinguishing equipment and fire fighting

Only fire extinguishers suitable for this purpose which contain extinguishing agents with high cooling characteristics may be used (see note under Section 1). In particular, fire extinguishers with water and, if necessary, extinguishing agent additives are suitable. Other extinguishing agents, e.g. ABC or BC powder, metal fire powder or carbon dioxide (CO2) are not suitable and must not be used! Additional warning and safety notices on the corresponding extinguishing devices, especially when using electrical devices, must be observed.

Minimum distances[1] are e.g. when using
• Portable and mobile fire extinguishers with a spray jet minimum 1 m,
• wall hydrants with spray jet (Euro nozzle) minimum 3 m and
• wall hydrants with full jet minimum 5 m.

Due to the fact that batteries can re-ignite even after a long period of time, they must be stored in water tanks or other suitable containers, e.g. emergency containers.

It must be ensured that in event of significant smoke or gas emission, the room or hazard zone is vacated immediately and adequate ventilation is provided.

[1] Larger minimum distances can also be prescribed. For this purpose, the specifications of the respective fire extinguishing equipment manufacturer should be observed, e.g. as stated on the label or in the operating instructions.

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Further information on this document can be obtained from department AKTUELL FBFHB-018 "Notes on industrial fire safety when storing and using lithium-ion batteries".

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