



Battery Charging

What is the hazard?

Battery charging is a common hazard found in most occupancies. A fire can start in equipment on-charge as a result of e.g. a short circuit, which may be the consequence of damage to cables, connectors, the charging units or the equipment on-charge. The charging of lead-acid batteries can also produce hydrogen gas, which is an explosion hazard. Lithium ion batteries have their own risks associated with them and are handled in a separate sheet.

How to reduce the risk

Locating battery charging facilities:

- Charging stations should be located in a separate fire compartment to minimise smoke damage to production and storage.
- If a separate fire compartment cannot be provided and battery charging must take place within a larger space, the area devoted to battery charging should not exceed 50 m², unless sprinkler protection is provided.
- The chargers should be fixed to a secure wall, but must never be directly fixed to combustible walls, such as sandwich panels with plastic insulation.
- Battery charging should never be located in an area in which there is a risk of explosion, for example where flammable liquids are handled.



Safety equipment in battery charging facilities:

- All areas used for battery charging should be equipped with automatic fire detection and suitable hand-held fire extinguishers. A carbon dioxide extinguisher (min. 5 kg) should be provided near the charging area.
- The chargers should be protected against collision and the cables should be installed to a minimum length and held off the floor to prevent damage. A spring-reel for the cable can be provided for this purpose (see picture).
- Improved protection against electrocution from damaged electrical equipment can be provided by installing a residual current device (RCD) on the battery chargers.
- Where there are large banks of battery chargers in a single area, the provision of a single emergency cut-off button to the electrical supply should be considered.

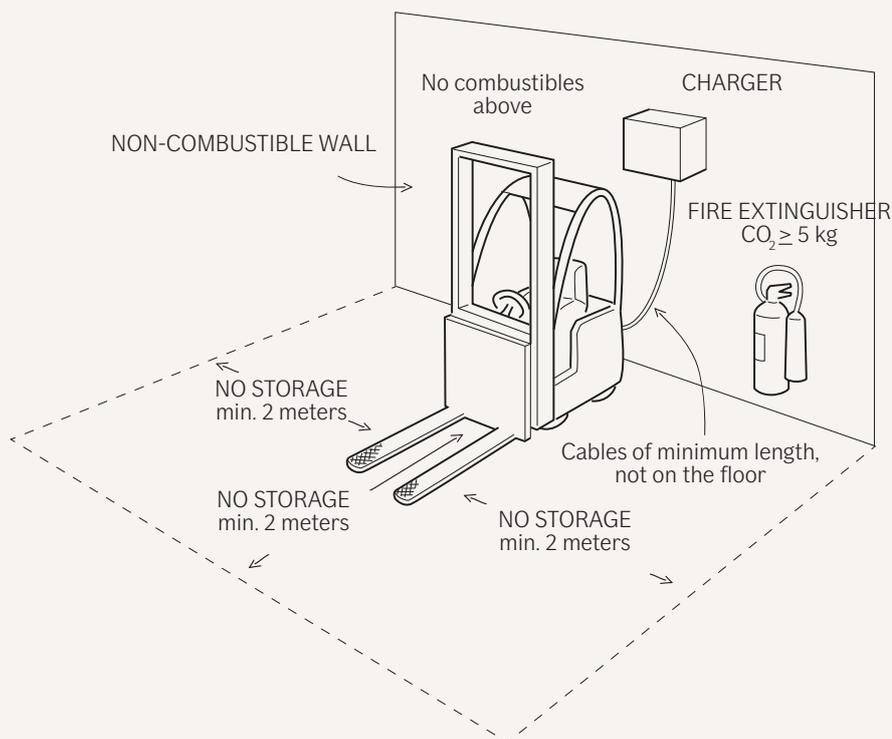
Housekeeping and maintenance in battery charging areas:

- A minimum clear area of 2 metres should be maintained around the battery charger and the equipment under charge. This area should not be used for storage.
- Also the area above the charging stations should be kept clear of combustible materials, including cables and cable trays. Combustible ceiling constructions should be avoided in battery charging areas.
- Regular inspections of battery charging areas should be maintained. These inspections should include the condition of the charging units and cables. Damaged chargers and cables should be replaced immediately. Where an infrared camera is available, this can be used to identify damaged cables, while they are in use.

Ventilation for battery charging:

- Battery charging using lead-acid batteries should only be carried out in well ventilated areas. Where ventilation is provided by forced extraction, the air exchange rate shall be calculated by using the latest recognised standard in regards to charging of traction batteries. Local regulations in regards to level of gas concentrations shall also be taken into account. In addition, the battery chargers should be interlocked with the ventilation, so that in the event of a failure in the ventilation, the battery chargers will be shut off. Air inlet (floor) and outlet (ceiling) shall be placed at the most favorable location from each other.
- Where ventilation is provided by natural air movement, openings of at least 400 cm² per 50 m³ of room volume should be provided at floor and ceiling levels.
- Hydrogen detectors can be installed in the ceiling of the battery charging areas. These can be interlocked to isolate the battery chargers when hydrogen is detected.





Batteries can be charged by an external unit, or by an internal charger, i.e. the equipment can be plugged-in to a normal electrical socket. In either case there is a risk of a fire starting. Because battery charging typically takes place in an out-of-the-way area or overnight, the fire may be able to develop without being detected. The fire will be able to grow quickly if there are combustible materials nearby.

The recommendations given above relate to battery charging on large equipment. However, even small portable equipment presents a fire risk when on-charge. Even though much of the above advice will be too restrictive for small device battery charging, the principles of keeping chargers away from combustible materials should be followed. Allowing batteries to be charged only in rooms equipped with automatic fire detection will also help to minimise the consequences of a fire involving the equipment.

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