

Safe storage of lithium batteries

Fire protection products for the storage of Li batteries

From small to large



Fire protection when storing and operating lithium batteries

Lithium batteries are highly efficient energy storage devices that are suitable for a wide range of applications. As energy demand continues to rise, energy storage will play a particularly important role, meaning that the demand for high-performance batteries will continue to increase.

Advantages of lithium batteries

- High cell voltage
- No memory effect with secondary batteries (rechargeable; primary batteries are not rechargeable)
- Low self-discharge

Due to these properties, lithium batteries are becoming increasingly popular in many areas of daily life as well as in the industrial sector. With the rapidly growing use of lithium batteries, manufacturers, installers and users have to deal just as intensively with the issue of safety. Technical defects or improper handling of the batteries during storage, charging and operation can lead to an under-controlled release of the stored energy, which usually results in a fire.

Applications of lithium batteries



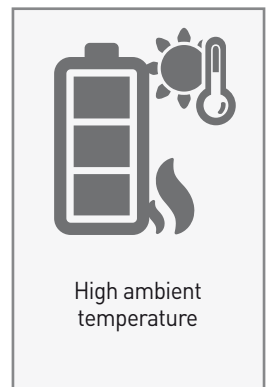
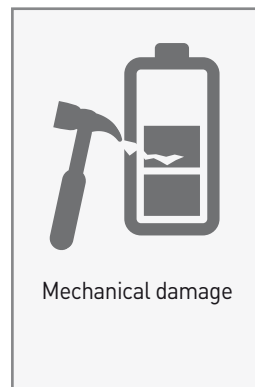
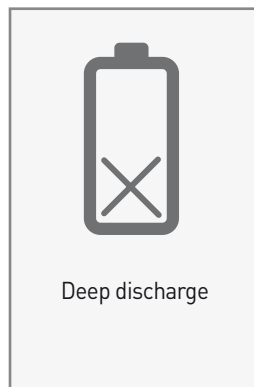
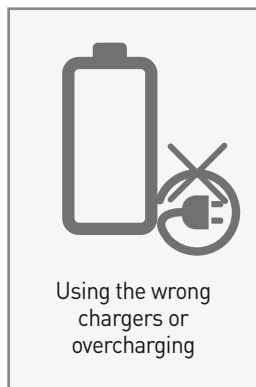
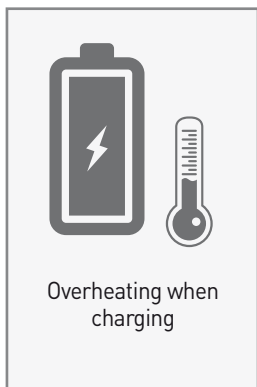
„From the property insurer’s view, lithium batteries must potentially be classified as a hazard ...“

Carsten Tormöhlen, Allianz Deutschland AG

19.08.2019 | Frankfurter Allgemeine

„Batteries cause a fire each and every week“

Causes of fires lithium batteries



„It is advisable to treat lithium batteries as a hazardous material during manufacture, production, storage and transport“.



Storage of lithium batteries



Storage of lithium batteries

Fire protection by means of:

- Fire resistant safety cabinets
- Fire resistant containers
- Fire resistant rooms (adapted room solutions for storing greater amounts of batteries)

Equipped with cable sheathings and fans as desired

Area of application:

- Electromobility (battery storage with the manufacturers of bicycles or cars and dealers)
- Storage in the area of small electrical units (such as entertainment electronics or tools)
- Storage in the disposal process

General safety rules according to capacity classes (VdS 3103: 2019-06)

The following general safety rules must be followed:

- Adherence to the specifications of the respective manufacturer and the technical product data sheets
- Prevention of external short circuits (protection against short circuit of the battery terminals, e.g. by means of caps)
- Prevention of internal short circuits (protection against mechanical damage)
- Do not expose directly and permanently to high temperatures or heat sources (e.g. direct solar irradiation)
- In any area not protected by an automatic extinguishing system, a structural or spatial separation of min. 2.5 m from other combustible materials shall be provided for.
- Immediately remove any damaged or defective lithium battery from the storage and production area and store this temporarily with safe distance or in an area separated with fire protection technology until its disposal.

„In the interest of effective damage prevention, however, conventional protection concepts with classic measures which have proven their worth in the production, handling and storage of flammable substances are suitable.“

Auszüge Fachaufsatz – Lithium Batterien – Brandgefahren und Sicherheitsrisiken von Dr. Michael Buser

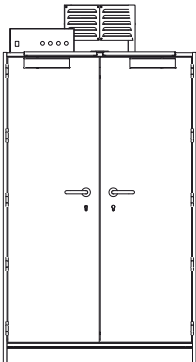
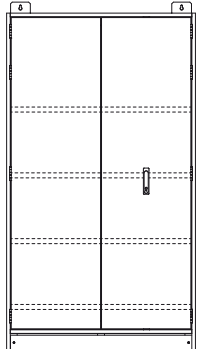
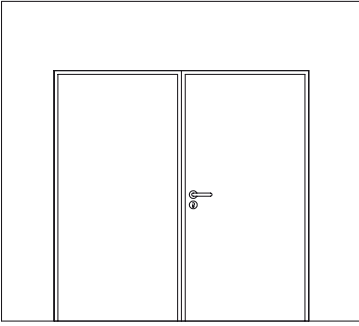
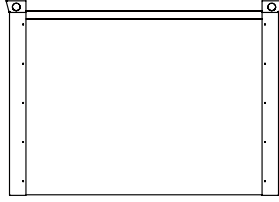
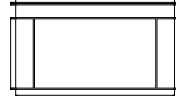
Li-Ion


ELECTRIC
VEHICLE
BATTERY

Tested quality and safety



Product overview for battery storage

| | | | | | | |
|--|--|--|--|---|-----------------|---|
| Cabinets for charging and storage of lithium-ion batteries | PRIOLION Material + Decor A2 Class Fire Resistance 90 Min. Fire Resistance 90 Min. |  | | | | |
| | | PRIOCAB-LI EI90 Material + Decor A2 Class Fire Resistance 90 Min. |  | | | |
| Boxes, rooms and containers | PRIOROOM Material + Decor A2 Class Fire Resistance 90 Min. |  | PRIOCOVER Material + Decor A2 Class Fire Resistance 90 Min. |  | PRIOPACK |  |



14.06.2019 | www.br.de

**Rechargeable batteries caused fire in
Wörth an der Isar, says recycling company**

01.09.2021 | Fuldaer Zeitung

**Major fire in the Main-Kinzig district!
Police come across the battery
of an e-bike**

24.02.2023 | Presseportal

**Sankt Augustin fire brigade: E-bike
battery on fire in the storage area**

24.09.2021 | www.nordbayern.de

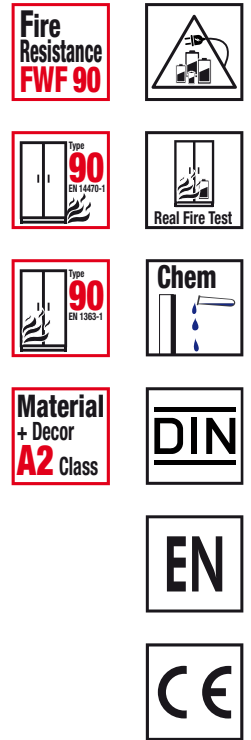
**Lithium batteries caught
fire in Fürth warehouse**

29.05.2021 | www.ndr.de

**Hazard for emergency forces: battery
specialist shop in Rostock burns out**



GS-zertifizierter
Sicherheitsschrank
„PRIOLION“



PRIOLION

2-leaf free-standing cabinet for storing and charging lithium-ion batteries

Fire-resistant safety cabinet, specially developed for the storage and charging of lithium-ion batteries. The safety cabinet, which was tested in accordance with test principle EK5/AK4 22-01 as well as in a internal real fire and GS (tested safety) certified, offers a fire resistance of 90 minutes both from the inside and the outside. This prevents a fire spreading from the inside to the outside as well as a burning of the critical stored goods in the event of a fire inside the installation site. A release of toxic fumes/gases in the event of a battery fire is prevented.

The cabinet can be easily moved and transported with a pallet truck or forklift thanks to a drive-under base. The mobile cabinet is designed for free-standing installation in a room, but can also be placed against a wall.

We recommend placing the cabinets in a ground-level location from which rapid evacuation is possible in the event of an incident.

Function

- Tested fire protection
- Tested fire resistance of 90 minutes from the outside to the inside according to DIN EN 14470-1
- Max. temperature rise in the interior at no temperature measuring point more than 100 K
- Tested fire resistance of 90 minutes from inside to outside according to DIN EN 1363-2
- GS mark - tested according to test principle EK5/AK4 22-01
- Self-closing doors tested for continuous use
- Suitable for the storage and charging of lithium-ion batteries
- Internal real fire test of an equipped cabinet



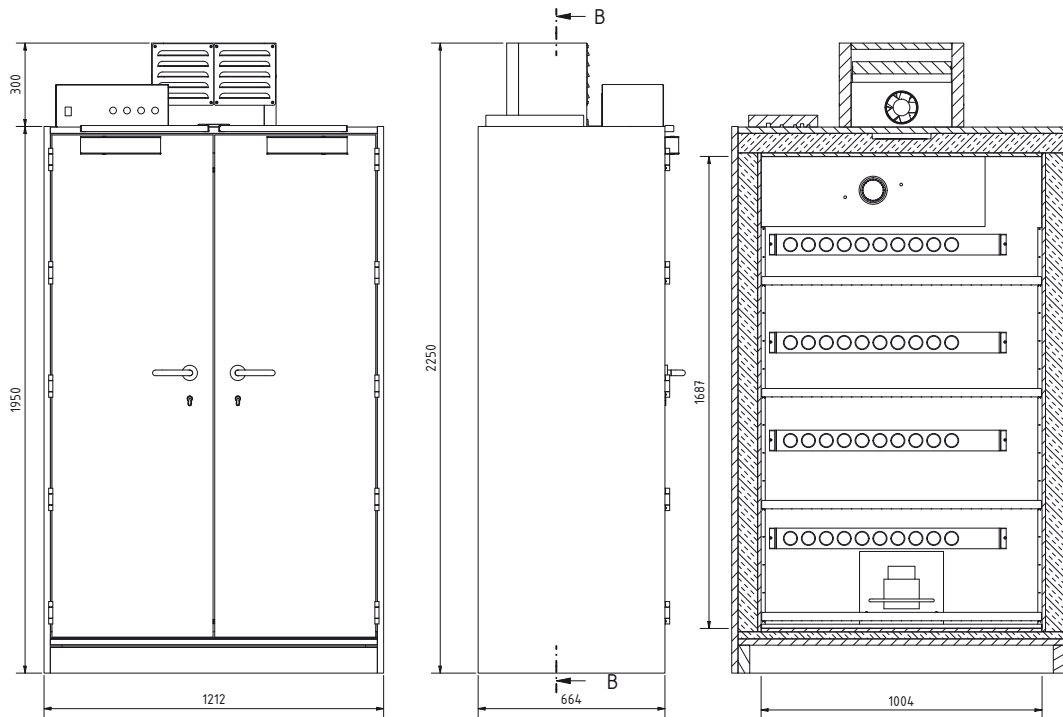
Structure & equipment

- Safety cabinet with high-quality surface inside and outside
- Permanently self-closing doors with oil-damped door closers
- Double-leaf version, double traffic leaf with centre bar
- Each door can be operated with one hand
- Cupboard doors close automatically from any position
- Doors lockable with profile cylinder (lockable)
- Incl. technical ventilation (to avoid heat accumulation in the interior)
- Closure of supply and exhaust air in case of fire, triggering via thermocouple and smoke detector
- Integrated pedestal that can be moved underneath, height 100 mm with removable pedestal cover, thus easy change of location possible
- Base cover included in scope of delivery
- Four height-adjustable gratings, max. load 75 kg/floor
- Integrated liquid-tight base tray (powder-coated sheet steel) to absorb any leakage that may occur.
- Each storage level can be equipped with a socket strip incl. 10 protective contact sockets
- Ready to plug in for connection to the mains supply
- With control unit as standard (visual and acoustic status indication)

- Smoke detector inside the cupboard automatically triggers in case of fire
- Optional fire suppression system
- A potential-free interface is available for connecting a signal (e.g. to a control centre).
- Complete disconnection of the power supply to the cabinet in the event of an emergency
- Overvoltage protection

Material & surface

- Standard surface CPL
- Non-combustible panel with surface coating, classified A2 - s1, d0: non-combustible
- Standard surface light grey, similar to RAL 7035
- Different decor surfaces on request



| Art. | Code ¹ | H x W x D mm | H x W x D mm | kg | Standard equipment |
|------|-------------------|--------------|--------------|----|--------------------|
|------|-------------------|--------------|--------------|----|--------------------|

Safety cabinet 2-winged; for active and passive storage of lithium-ion batteries

| | | | | | |
|--------------|-------|-------------------|-------------------|-----|--|
| LI92.195.120 | .x .y | 1687 x 1004 x 453 | 2250 x 1212 x 664 | 706 | 4 grating shelves, floor tray, control unit 230 V / AC |
|--------------|-------|-------------------|-------------------|-----|--|

| x | Equipment variants | |
|----|-------------------------|--|
| | Fire suppression system | Socket strip (total number of sockets) |
| 00 | ✓ | - |
| 01 | - | 1 (10) |
| 02 | ✓ | 1 (10) |
| 03 | - | 2 (20) |
| 04 | ✓ | 2 (20) |
| 05 | - | 3 (30) |
| 06 | ✓ | 3 (30) |
| 07 | - | 4 (40) |
| 08 | ✓ | 4 (40) |

| y | Equipment variants |
|---|--------------------------|
| | Control unit* 400 V / AC |
| 4 | ✓ |

*Increase in overall socket capacity
 (3-phase fuse protection = 3 x 16 A; total power = 11.0 kW; 400 V)

Order examples:

- LI92.195.120 → Standard equipment
- LI92.195.120.03 → Standard equipment + additional 2 socket strips with 2 x 10 sockets
- LI92.195.120.04.4 → Standard equipment + additional fire suppression system, 2 socket strips with 2 x 10 slots and a control unit 400 V / AC for a fuse protection 3 x 16 A

Options and accessories

| Art. | Accessories | L x W x H mm | kg |
|-----------|--|-----------------|-----|
| LI92.Z.GR | 1 mesh grid shelf with 4 shelf supports packed in a box | 1000 x 400 x 30 | 8.0 |
| EBEL-GSM | EBEL-GSM telecommunication module, power supply unit, 2x CR123 batteries, SIM card, connection cable (1 m) with suitable plug for PRIOLION | | 1.0 |

Free-standing cabinet in special colour; ESL 92.12444.BAT



Fire
Resistance
90 Min.



Smoke
Protection
min leakage



Material
+ Decor
A2 Class



EN



DIN

PRIOCAB-Li EI90

2-leaf free-standing cabinet for the storage of lithium-ion batteries

PRIORIT free-standing cabinet in double-leaf design, suitable for smoke-tight and fire-resistant storage of lithium-ion batteries. The cabinet is made of a non-combustible building material of class A2 - s1, d0. Safety cabinet with active fire suppression in the event of an accident - can stop the spread of fire inside the cabinet and minimise

the escape of toxic vapours. The cabinets have a ventilation system in the rear wall and cable entries at the top and bottom as standard.

- Tested fire protection from the inside and outside
- Fire resistance rating over 90 minutes
- Tested fire load insulation
- Housing with high mechanical resistance
- Housing made of noncombustible material including the decorative surface
- Protection against unauthorised access – pivot lever with two-way cylinder
- All-round fire protection seal, intumescent in case of fire
- Top and bottom cable entry
- Integrated ventilation system, consisting of smoke detector and fan
- Cold smoke-tight closure system

- Smooth and easy, free-moving doors, inset type door, opening angle approx. 180°
- Accessible plinth (e.g. fork-lift forks), height 100 mm with removable plinth cover panel
- Height-adjustable mesh shelves, load capacity 75 kg/floor
- Standard colour light grey, similar to RAL 7035

Options

- Individual colour design
- Available in different configurations
- Additional grating shelves



Control unit with fire detection

Malfunction message via optical signal and switch-off of the ventilation system.



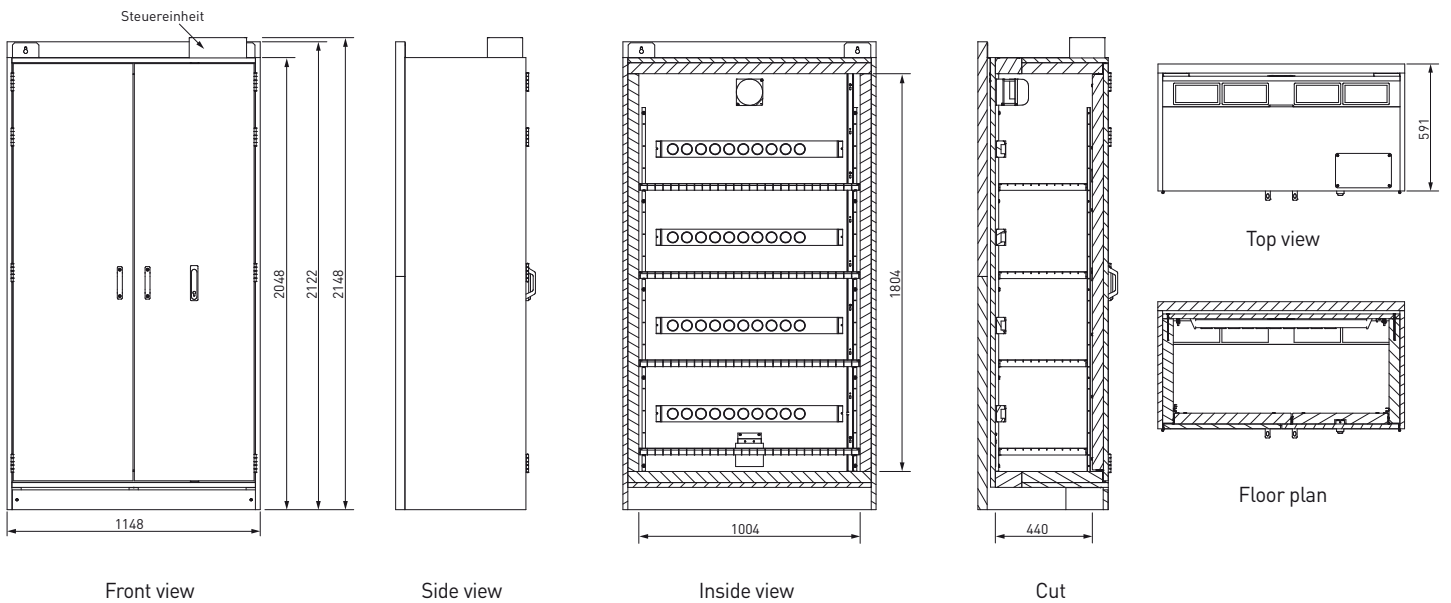
Fire extinguishing generator




Current-independent tripping in the event of fire and impermissible temperature rise.





Power strips

Technical drawing – Example: ESL92.12144.BAT15



| Art. |  |  |  | Mesh shelves | Socket strips | | Extinguishing unit |
|---|---|---|---|--------------|---------------|----------------|--------------------|
| | H x W x D mm | H x W x D mm | kg | | Quantity | Socket outlets | |
| 2-leaf free-standing cabinet for the storage of lithium-ion batteries - Without control unit | | | | | | | |
| ESL92.12444.BAT | 1804 x 1004 x 440 | 2048 x 1148 x 591 | 650 | 4 | - | - | - |
| ESL92.12444.BAT-A | | | | 4 | - | - | ✓ |
| 2-leaf free-standing cabinet for the storage of lithium-ion batteries - With control unit | | | | | | | |
| ESL92.12444.BAT09 | 1804 x 1004 x 440 | 2148 x 1148 x 591 | 650 | 4 | 1 | 10 | - |
| ESL92.12444.BAT10 | | | | 4 | 1 | 10 | ✓ |
| ESL92.12444.BAT11 | 1804 x 1004 x 440 | 2148 x 1148 x 591 | 650 | 4 | 2 | 20 | - |
| ESL92.12444.BAT12 | | | | 4 | 2 | 20 | ✓ |
| ESL92.12444.BAT13 | 1804 x 1004 x 440 | 2148 x 1148 x 591 | 650 | 4 | 3 | 30 | - |
| ESL92.12444.BAT14 | | | | 4 | 3 | 30 | ✓ |
| ESL92.12444.BAT15 | 1804 x 1004 x 440 | 2148 x 1148 x 591 | 650 | 4 | 4 | 40 | - |
| ESL92.12444.BAT16 | | | | 4 | 4 | 40 | ✓ |

Options and accessories

| Art. | Accessories |  |  |
|---------------------|------------------------------------|---|---|
| | | kg | H x W x D mm |
| BAT.FBO.ESL92.XX444 | 1 mesh shelf with 4 shelf supports | 7 | 30 x 1000 x 400 |



Example application

**Fire
Resistance
90 Min.**



**Material
+ Decor
A2 Class**



SYSTEM 42

PRIOROOM

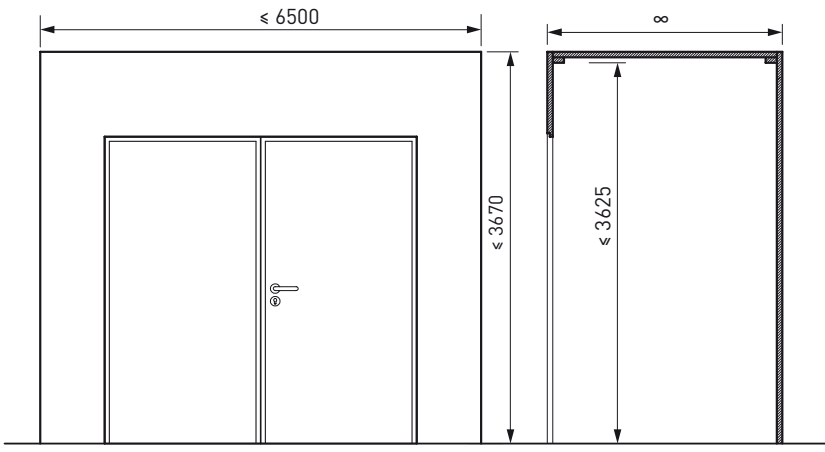
Individually designable room consisting of individual noncombustible elements

Fire-resistant room for safe storage of lithium-ion batteries. The 42 mm modular system made of prefabricated panels can be used to create a separate fire compartment, quickly and cleanly. The advantages: highly chemically-resistant surfaces inside and outside, easy assembly, modification and extension. The room has an accessible, level threshold entrance and can be equipped with heavy-duty racking. The room offers a fire resistance rating of 90 minutes.

- Fire resistance rating 90 minutes, fire resistant
- Walls: EI 90 classification
- Ceiling: F 90/EI 90 a↔b
- T 90-RS classification of the door(s)
- Door(s) smoke-tight, tested for resistance to repeated opening and closing
- Room with high mechanical resistance
- Accessible entry
- One or two-leaf door(s)
- Door(s) with 3D stainless steel hinges, triple locking, prepared for profile cylinder
- Room can be equipped on site with light, ventilation technology, smoke detector and shelves or racking
- Delivery on pallet, installation on site

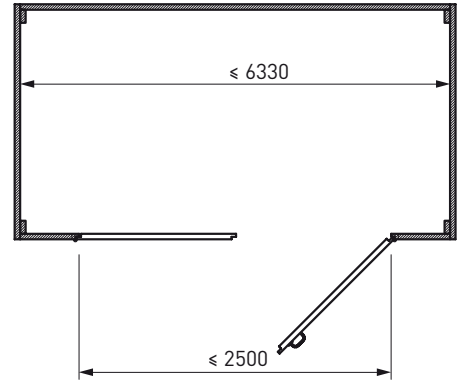
Options

- Special colours
- Explosion-proof smoke detector



Front view

Side view



Floor plan

Application example





Easy handling

Stable under pressure

Fire resistant design



PRIOCOVER

Mobile fire enclosure

Universally usable pop-over enclosure for comprehensive fire protection in case of active or passive storage of lithium-ion batteries. The enclosure is open at the bottom and is fitted with stable corner angles. The lifting eyebolts enable easy transport and easy moving into position. The enclosure can also be popped over the batteries when they begin to burn. The fire enclosure has a fire resistance rating of 90 minutes.

- Non-combustible incl. decorative surface, A2-s1,d0
- Fire resistant design – 90-minute fire resistance
- Stable under pressure
- Mechanical pressure relief
- Report of an accredited material test institute
- Suitable for passive and active storage
- Easy handling
- Mobile, simple solution
- No time-consuming transfer of the batteries into safety cabinets
- Easy to pop over filled pallets
- Fast moving into position by forklift truck
- Easy transport by means of lifting eyes

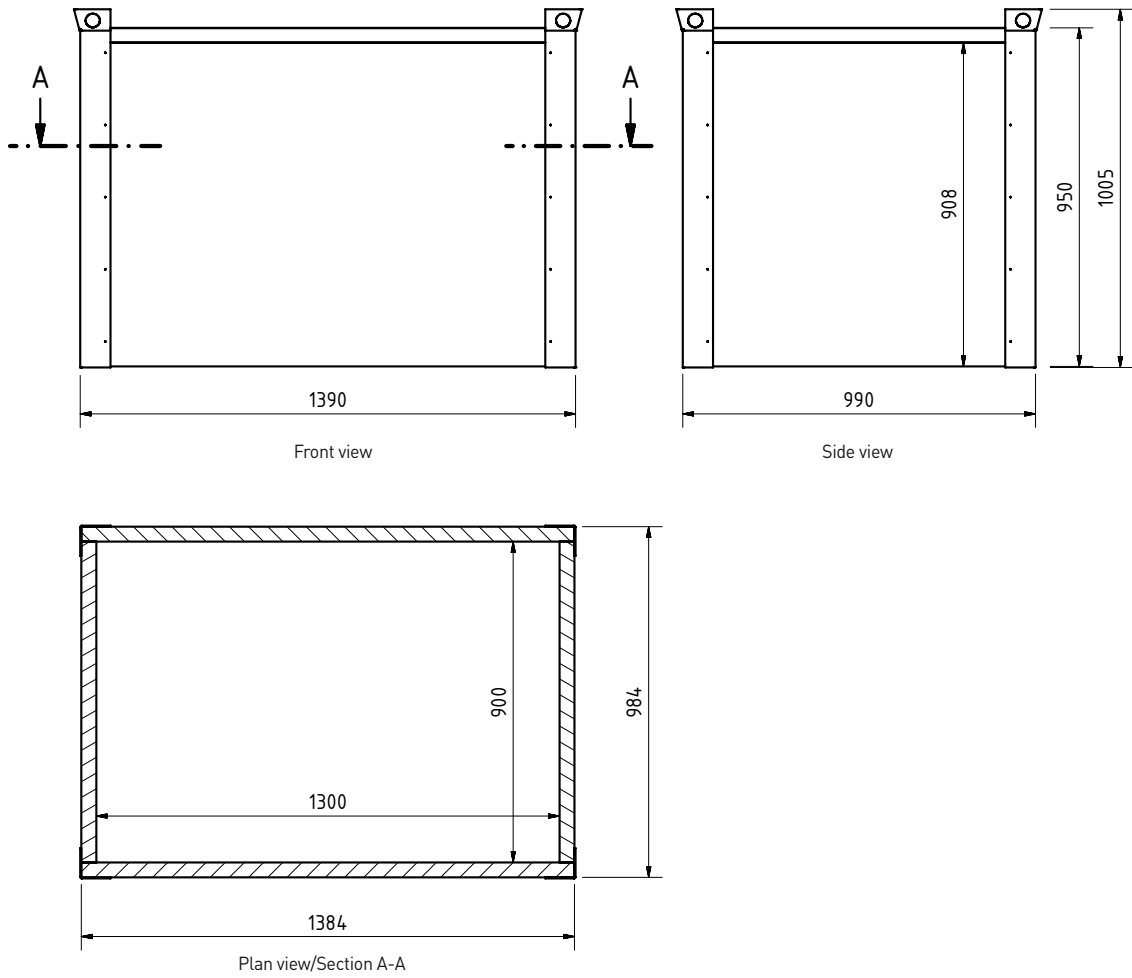
- Corner angle edge protection
- Space saving, as stackable
- Standard size for covering a euro-pallet 1200 x 800
- Covering of pallets, containment trays or cages
- Placement directly on existing floor

Sustainability

- Recyclable
- Green building declaration in accordance with LEED and DGNB
- Contaminant-free




Options

- Special colours
- PRIOCOVER including fitting kit for a cooling water connection
- Cable penetration seal
- Floor drip tray
- Lifting set



Application example






| Art. |  H x W x D mm |  H x W x D mm |  kg | Description |
|------|---|---|--|-------------|
|------|---|---|--|-------------|

Standard type

| | | | | |
|----------------|------------------|-------------------|-----|--|
| PC.138.098.095 | 908 x 1300 x 900 | 1005 x 1390 x 990 | 400 | |
|----------------|------------------|-------------------|-----|--|

Other sizes on request

Tender specification text and current price list: www.priorit.de

| Art. |  H x W x D mm |  H x W x D mm |  kg | Description |
|------|---|---|--|-------------|
|------|---|---|--|-------------|

Optional types

| | | | | |
|---------------------|------------------|-------------------|-----|--|
| PC.138.098.095.F | 908 x 1300 x 900 | 1005 x 1390 x 990 | 400 | Enclosure incl. fitting kit |
| PC.138.098.095.KE | 908 x 1300 x 900 | 1005 x 1390 x 990 | 400 | Enclosure incl. cable penetration seal |
| PC.138.098.095.F.KE | 908 x 1300 x 900 | 1005 x 1390 x 990 | 400 | Enclosure incl. fitting kit and cable penetration seal |



PRIOPACK

Storage container for safe storage of rechargeable lithium-ion batteries

Storage containers for the storage of defective or damaged batteries with increased fire risk and for minimising the toxic fumes associated with a thermal runaway.




The storage container is lined with a non-combustible thermal insulation material and has a fire resistance of 90 minutes. Additional filling and insulating material, which can absorb leaking electrolytes, completely encloses the Li-Ion batteries to be stored.

This means that even with a thermal runaway - a chemical reaction with extreme heat development - the danger of fire spreading is prevented and the generation of toxic gases is minimised.

- Fire resistant storage containers
- Storage containers made of plastic
- Closure by means of hinged cover and snap lock
- Tight-closing cover
- Tight closure, including in case of fire – no lifting up of the cover
- Lined with a nonflammable thermal insulation material
- Colour grey

Accessories

- Filler packs must be ordered separately.
Recommended quantity depending on the size of the batteries:
PP.040.030.023.VV: 2 to 3 packs per box
PP.060.040.023.VV: 4 to 5 packs per box
(one pack = 8 pieces)

| Art. |  H x W x D mm |  H x W x D mm |  kg |
|--------------------------|--|--|--|
| Storage container | | | |
| PP.040.030.023.VV | 307 x 208 x 164 | 400 x 300 x 233 | 8 |
| PP.060.040.023.VV | 507 x 308 x 164 | 600 x 400 x 233 | 15 |
| PP.018.015.VK | Filler pack; 180 x 150 mm (length x width); 8 ea. = 520 g = 1 PU | | 0,52 |

Other sizes on request

Manufactory and Safety

Our ISO 9001 certification provides safety and peace of mind. All development and production processes of PRIORIT fire protection products comply with internationally recognized regulations. You can be assured of that! That is a certainty!

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