



# Lithium-ion selection

Fire resistant safety cabinets 105 min

Double-walled insulated safety cabinets





## 105 MINUTES SECURITY CABINETS FOR LITHIUM-ION BATTERY STORAGE

To ensure the safety of people and goods, we have created a safety storage solution for Lithium-ion batteries. Indeed, lithium-ion batteries have the particularity to present many risks of which the most known and the most frequent is the thermal runaway may be caused by a rise of temperature of the environment, a shock or a problem of assembly of the cabinet.

**The consequence is that the battery can ignite dangerously and cause a fire.**

Based on our experience and our know-how on the EN14470-1 105 minutes European standard fire-proof cabinets, we offer several models of different sizes that can meet the widest variety of storage needs. These cabinets can be equipped as needed, with perforated shelves (with high load capacity - 100kg per level) and Containment sumps in the lower part of the cabinet to prevent possible electrolyte leakage damages from the battery. There is also the possibility to recharge batteries stored via the rack power strips.

The exceptional fire resistance of our cabinets (105 minutes under the European test) guarantees maximum safety. However, it is possible to further secure the storage by adding optional solutions such as:

- The internal safety extinguisher in the special lithium-ion battery cabinet (ref. EX100LI or EX200LI)
- Or the safety set including the extinguisher, an audible and visual alarm, the smoke detector, the control box and a cable pass-through in the upper part of the cabinet PINTOLI ref. (VIG190 ou VIG290).

There are four types of usage, depending on your needs:

- Simple battery storage: Cabinet equipped with perforated shelves and a Containment sump.

- Storage and charging of batteries: Cabinet equipped with perforated shelves, a Containment sump and electrical outlet racks + PEXTBALI (max. 4 cables from 4 to 15 mm).
- Simple battery storage + advanced protection system: Cabinet equipped with perforated shelves with a Containment sump + optional advanced protection system (either a fire extinguisher or a security set including visual and sound alarm, control box, automatic smoke detector, fire extinguisher and cable pass-through).
- Storage and charging of batteries + advanced protection system: Cabinet equipped with perforated shelves, a Containment sump and electrical outlet racks + optional advanced protection system (either a fire extinguisher or a security set including visual and sound alarm, control box, automatic smoke detector, fire extinguisher and cable pass-through).

Any polluting liquid must be stored in tanks having a retention capacity of at least 50% of the volume of that liquid, as well as the retention capacity for flammable or combustible liquids contained in movable containers less than or equal to 250 L must be at least 800 L.

The containment sump must be of controlled tightness and must resist the physiochemical properties of the material it contains. Their storage is governed by chemical incompatibilities and the established safety rules put in place.

In the event of a fire, the cabinets must not be moved except by the fire brigade.

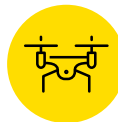
### OUR CABINETS ARE SUITABLE FOR STORING AND RECHARGING LITHIUM-ION BATTERIES INCLUDED IN THE FOLLOWING EQUIPMENT (NON-EXHAUSTIVE LIST):



Electric bicycles



Chainsaws, hedge trimmers, lawn mowers...



Drones



Electric bikes



Electro-portable battery powered tools



Electric scooters



Elevator trolleys

### CONFORMITY

- Proven fire resistance of 105 minutes, according to the ISO 834 curve as per the EN 14470-1 standard
- Standardized warning labels in accordance to ISO 3864 and ISO 7010, as well as the European directive 92/58/EEC.

### CONSTRUCTION

- Steel construction and double thermal insulation triple wall.
- Outer walls in 12/10th steel and white RAL 9010 epoxy painting.
- Thermal insulation panels limiting thermal bridges
- Melamine interior panels.

### EQUIPMENTS

- Thermodilating door seals.
- Doors with automatic closing.
- Key closing.
- Ventilation holes with ventilation outlet Ø 100 mm for possible connection.
- Ventilation ducts with hot-melt system to isolate the contents of the cabinet in case of fire.
- Fixing point for earthing link.

### OPTIONAL ACCESSORIES

- Perforated shelves with a load capacity of 100 kg (ref. E34LI and E35LI)
- Removable Containment sump at the bottom (ref. B148 and B235)
- Automatic fire extinguisher at 79°C by special lithium thermal bulb (ref. EX100LI or EX200LI)
- Rack of 9 electrical outlets for recharging batteries (ref. PRISELI)
- Drilling in the lower part for cable passage with fire-resistant cable gland (Ref. PEXTBALI)
- Set of security and alarm including visual and audible alarm, control box, automatic smoke detector, fire extinguisher and cable pass-through (Ref. VIG190 or VIG290).

### VENTILATION

All cabinet models have ventilation holes, allowing them to be connected to a ventilation system. Forced ventilation is strongly recommended to prevent internal heat build-up or stagnation of vapors in the event of electrolyte liquid leakage. The latter can be connected either to an external outlet or to a ventilation or filtration box.



795+LIX4 + 4 PRISELI + B235



**1**  
Audible and visual alarm  
(VIG290)



**2**  
Smoke detector  
(VIG290)



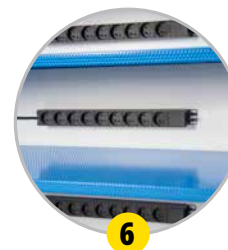
**3**  
Visual and audible  
alarm box (VIG290)



**4**  
Automatic fire extinguisher  
(EX200LI) included in VIG290



**5**  
Pallet truck movement  
(empty)



**6**  
PRISELI racks and  
shelves (E35LI)



▲  
798+LIX2 + 2 PRISELI + B148



▲  
793+LIX2 + 2 PRISELI + B235

## NON-EQUIPPED CABINETS

P/N	Description	External dimensions H x W x D (mm)	Interior dimensions H x W x D (mm)	Empty weight without options
793+LI	2 doors counter cabinet to be equipped	1100 x 1137 x 670 <sup>(1)</sup>	820 x 1000 x 410	297
798+LI	1 door counter cabinet to be equipped	1100 x 635 x 670 <sup>(1)</sup>	820 x 490 x 410	182
794+LI	1 door tall cabinet to be equipped	1950 x 635 x 620 <sup>(2)</sup>	1620 x 490 x 410	287
795+LI	2 doors tall cabinet to be equipped	1950 x 1137 x 620 <sup>(2)</sup>	1620 x 1000 x 410	453

## PRE-EQUIPPED CABINETS

P/N	Description	External dimensions H x W x D (mm)	Weight (kg)
793+LIA2	2 doors counter-top 90 minutes fire cabinet for lithium batteries pre-equipped with 2 x E35LI shelves + 1 x EX100LI (extinguisher)	1100 x 1137 x 670 <sup>(1)</sup>	299
793+LIX2	2 doors counter-top 90-minutes fire cabinet for lithium batteries, pre-equipped with 2 E35LI shelves + 1 x VIG190 (visual and audible alarm, control box, automatic smoke detector, EX100LI fire extinguisher and cable duct on top [ref. PINTOLI])	1100 x 1137 x 670 <sup>(1)</sup>	302
798+LIA2	1 door counter-top 90 minutes fire cabinet for lithium batteries pre-equipped with 2 shelves E48LI + 1 x EX100LI (extinguisher)	1100 x 635 x 670 <sup>(1)</sup>	184
798+LIX2	90-minutes fire cabinet, counter-top, 1 door for lithium batteries, pre-equipped with 2 shelves E48LI + 1 x VIG190 (visual and audible alarm, control box, automatic smoke detector, EX100LI fire extinguisher and cable duct on top [ref. PINTOLI])	1100 x 635 x 670 <sup>(1)</sup>	187
794+LIA4	1 door high 90 minutes fire cabinet for lithium batteries pre-equipped with 4 shelves E48LI + 1 x EX100LI (extinguisher)	1950 x 635 x 620 <sup>(2)</sup>	289
794+LIX4	1 door high 90 minutes fire cabinet for lithium batteries pre-equipped with 4 shelves E48LI + 1 x VIG190 (visual and audible alarm, control box, automatic smoke detector, EX100LI fire extinguisher and cable duct on top [ref. PINTOLI])	1950 x 635 x 620 <sup>(2)</sup>	292
795+LIA4	2 doors high 90 minutes fire cabinet for lithium batteries pre-equipped with 4 shelves E35LI + 1 x EX200LI (extinguisher) and 4 shelves E35LI	1950 x 1137 x 620 <sup>(2)</sup>	455
795+LIX4	2 doors high 90-minutes fire cabinet for lithium batteries, pre-equipped with 4 E35LI shelves + 1 x VIG290 (visual and audible alarm, control box, automatic smoke detector, EX200LI fire extinguisher and cable duct on top [ref. PINTOLI])	1950 x 1137 x 620 <sup>(2)</sup>	457

(1) Depth including connecting sleeve at the back. Depth without sleeve: 620 mm  
 (2) Height including connecting sleeve at top. Height without sleeve: 1900 mm



▲ 794+LIX4 + 4 PRISELI + B148



▲ 795+LIX4 + 4 PRISELI + B235

## ACCESSORIES

P/N	Description	Weight (kg)	Corresponding cabinet(s)
E48LI	Perforated shelf for 1 door cabinet	5	798+LI et 794+LI
E35LI	Perforated shelf for 2 doors cabinet	7	793+LI et 795+LI
B148	Containment sump for 1 door cabinet	5	798+LI et 794+LI
B235	Containment sump for 2 doors cabinet	10	793+LI et 795+LI
EX100LI	Fire extinguisher with automatic triggering at 79°C per thermal bulb for lithium	2	All models except 795+LI
EX200LI	Fire extinguisher with automatic triggering at 79°C per thermal bulb for lithium for 795+LI	3	795+LI
VIG190	Security and alarm package including visual and audible alarm, control box, self-activating smoke detector, EX100LI fire extinguisher and cable duct	5	All models except 795+LI
VIG290	Security and alarm package including visual and audible alarm, control box, self-activating smoke detector, EX200LI fire extinguisher and cable duct for 795+LI	6	795+LI
PEXTBALI	Cable entry hole with fire-resistant cable entry at the bottom (max. 4 cables)	-	All models
PINTOLI	Internal cable duct in the upper part	-	All models
PRISELI	Rack of 9 electrical outlets (250 volts - 4000 watts - 16 amps)	2	All models
PRISELIC	Rack of 6 electrical outlets equipped with a thermal-magnetic circuit breaker	-	All models
ONDULI	4-socket safety inverter for VIG190 or VIG290 only (H 90 x W 163 x D 245 mm - 230 volts - 300 watts - 500 volts)	3,5	All models
SERCODE	Digital code lock	1	All models





## SAFETY CABINETS FOR THE STORAGE OF OF LITHIUM-ION BATTERIES

To ensure the safety of people and goods, we have created a safety storage solution for Lithium-ion batteries. Indeed, lithium-ion batteries have the particularity to present many risks of which the most known and the most frequent is the thermal runaway may be caused by a rise of temperature of the environment, a shock or a problem of assembly of the battery.

**The consequence is that the battery can ignite dangerously and cause a fire.**

Based on our experience and our know-how on the EN14470-1 105 minutes European standard fire-proof cabinets, we offer several models of different sizes that can meet the widest variety of storage needs. These cabinets can be equipped as needed, with perforated shelves (with high load capacity - 100kg per level) and Containment sumps in the lower part of the cabinet to prevent possible electrolyte leakage damages from the battery. There is also the possibility to recharge batteries stored via the rack power strips.

The exceptional fire resistance of our cabinets (105 minutes under the European test) guarantees maximum safety. However, it is possible to further secure the storage by adding optional solutions such as :

- The internal safety extinguisher in the special lithium-ion battery cabinet (ref. EX100LI or EX200LI)
- Or the safety set including the extinguisher, an audible and visual alarm, the smoke detector, the control box and a cable pass-through in the upper part of the cabinet PINTOLI ref. (VIG190 ou VIG290).

There are four types of usage, depending on your needs :

- Simple battery storage : Cabinet equipped with perforated shelves and a Containment sump.

- Storage and charging of batteries : Cabinet equipped with perforated shelves, a Containment sump and electrical outlet racks + PEXTBALI50 (max. 4 x 8 mm cable entry).
- Simple battery storage + advanced protection system : Cabinet equipped with perforated shelves with a Containment sump + optional advanced protection system (either a fire extinguisher or a security set including visual and sound alarm, control box, automatic smoke detector, fire extinguisher and cable pass-through).
- Storage and charging of batteries + advanced protection system : Cabinet equipped with perforated shelves, a Containment sump and electrical outlet racks + optional advanced protection system (either a fire extinguisher or a security set including visual and sound alarm, control box, automatic smoke detector, fire extinguisher and cable pass-through).

Any polluting liquid must be stored in tanks having a retention capacity of at least 50% of the volume of that liquid, as well as the retention capacity for flammable or combustible liquids contained in movable containers less than or equal to 250 L must be at least 800 L.

The containment sump must be of controlled tightness and must resist the physiochemical properties of the material it contains. Their storage is governed by chemical incompatibilities and the established safety rules put in place.

In the event of a fire, the cabinets must not be moved except by the fire brigade.

### OUR CABINETS ARE SUITABLE FOR STORING AND RECHARGING LITHIUM-ION BATTERIES INCLUDED IN THE FOLLOWING EQUIPMENT (NON-EXHAUSTIVE LIST) :



Electric bicycles



Chainsaws, hedge trimmers, lawn mowers...



Drones



Electric bikes



Electro-portable battery powered tools



Electric scooters



Elevator trolleys

### COMPLIANCE

- Non-flammable insulating panels, classified A1 according to NF EN ISO 1182, between the walls.
- Standardized warning labels in accordance to ISO 3864, ISO 7010 and NF X08.003, and to European Directive 92/58/EEC.

### CONSTRUCTION

- Double wall 12/10 steel construction.
- Mineral fibre insulation 20 mm thick in accordance to NF EN ISO 1182.
- White epoxy paint RAL 9010.
- Standardized symbols "noxious", "toxic" or "flammable" (to be specified when ordering).
- Adjustable retention shelves on racks.

### EQUIPMENTS

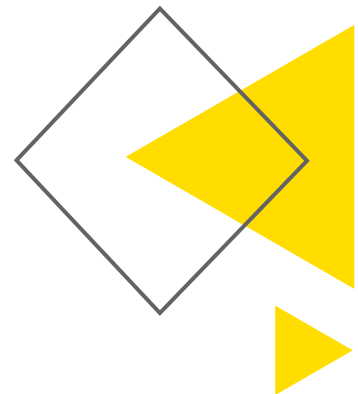
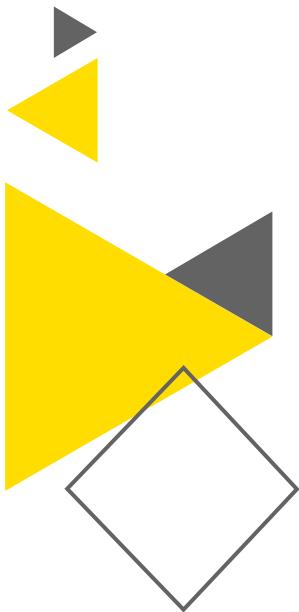
- Ventilation by means of a lateral inner duct with opening at the top and bottom (Ø 100 mm).
- Roof ventilation outlet with connection sleeve (Ø 100 mm).
- Hinged doors with reinforced hinges with manual closing.
- Two-point locking.
- Key lock.

### OPTIONS

- Perforated shelves with 50 KG load capacity (Ref. E04LI or E06LI)
- Removable Containment sump at the bottom (Ref. BP04 or BP06)
- Fire extinguisher with automatic release at 79°C by special lithium thermal bulb (Ref. EX100LI or EX200LI)
- Rack of 9 electrical sockets for recharging batteries (Ref. PRISELI)
- Drilling in the lower part for cable passage with fireproof cable gland (Ref. PEXTBALI50 )
- Security and alarm unit including visual and audible alarm, control box, automatic smoke detector, fire extinguisher and cable duct (Ref. VIG190 or VIG290)

### VENTILATION

All cabinet models are equipped with ventilation holes, allowing them to be connected to a ventilation system. Forced ventilation is strongly recommended to avoid internal heat build-up or stagnation of vapors in case of electrolyte leakage. This can be connected either to an external outlet or to a ventilation or filter box.



▲ S2004 + LIX5 + 5 PRISELI + GL04



**1**  
Audible and visual alarm (VIG290)



**2**  
Smoke detector (VIG290)



**3**  
Visual and audible alarm box (VIG290)



**4**  
Automatic fire extinguisher (EX200LI) included in VIG290



**5**  
Moving by pallet truck (empty)



**6**  
PRISELI racks and shelves (E04LI)



▲ S804+LIX1 + PRISELI + GL04



▲ S806+LIX1 + PRISELI + GL06

## NON-EQUIPPED CABINETS

P/N	Description	External dimensions H x W x D (mm)	Interior dimensions H x W x D (mm)	Empty weight without options
S804LI	2 doors counter cabinet to be equipped (depth 450)	895 x 1000 x 450 <sup>(1)</sup>	745 x 950 x 400	75
S806LI	2 doors counter cabinet to be equipped (depth 600)	895 x 1000x 600 <sup>(1)</sup>	745 x 950 x 550	90
S2004LI	2 doors tall cabinet to be equipped (depth 450)	2095 x 1000 x 450 <sup>(2)</sup>	1945 x 950 x 400	152
S2006LI	2 doors tall cabinet to be equipped (depth 600)	2095 x 1000 x 600 <sup>(2)</sup>	1945 x 950 x 550	174

## PRE-EQUIPPED CABINETS

P/N	Description	External dimensions H x W x D (mm)	Weight (kg)
S804+LIA1	2 doors counter-top fire resistant cabinet for lithium batteries pre-equipped with 1 x E04LI shelf + 1 x EX100LI (fire extinguisher)	895 x 1000 x 450 <sup>(1)</sup>	77
S804+LIX1	2 doors countertop fire resistant cabinet for lithium batteries pre-equipped with 1 x E04LI shelf + 1 x Vig190 (visual and audible alarm, control box, automatic smoke detector, EX100LI fire extinguisher and cable duct on top [ref. PINTOLI ])	895 x 1000 x 450 <sup>(1)</sup>	80
S806+LIA1	2 doors countertop fire resistant cabinet for lithium batteries pre-equipped with 1 x E06LI shelf + 1 x EX100LI (extinguisher)	895 x 1000x 600 <sup>(1)</sup>	92
S806+LIX1	2 doors countertop fire resistant cabinet for lithium batteries pre-equipped with 1 x shelf E06LI + 1 x Vig190 (visual and audible alarm, control box, automatic smoke detector, EX100LI fire extinguisher and cable passage in the upper part [ref. PINTOLI ])	895 x 1000x 600 <sup>(1)</sup>	95
S2004+LIA5	2 doors high fire resistant cabinet for lithium batteries pre-equipped with 5 shelves E04LI + 1 x EX200LI (extinguisher)	2095 x 1000 x 450 <sup>(2)</sup>	154
S2004+LIX5	2 doors high fire resistant cabinet for lithium batteries pre-equipped with 5 shelves E04LI + 1 x Vig290 (visual and audible alarm, control box, automatic smoke detector, EX200LI fire extinguisher and cable passage in the upper part [ref. PINTOLI ])	2095 x 1000 x 450 <sup>(2)</sup>	157
S2006+LIA5	2 doors high fire resistant cabinet for lithium batteries pre-equipped with 5 shelves E06LI + 1 x EX200LI (extinguisher)	2095 x 1000 x 600 <sup>(2)</sup>	176
S2006+LIX5	2 doors high fire resistant cabinet for lithium batteries pre-equipped with 5 shelves E06LI + 1 x Vig290 (visual and audible alarm, control box, automatic smoke detector, EX200LI fire extinguisher and cable passage in the upper part [ref. PINTOLI ])	2095 x 1000 x 600 <sup>(2)</sup>	179

(1) Depth including connecting sleeve at the back. Depth without sleeve: 400mm (S804LI) 550mm (S806LI)

(2) Height including connecting sleeve at top. Height without sleeve: 2045 mm





▲ S2004+LIX5 + 5 PRISELI + GL04



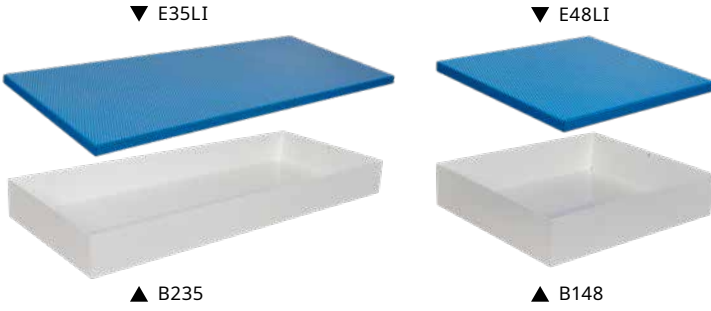
▲ S2006+LIX5 + 5 PRISELI + GL06

## ACCESSORIES

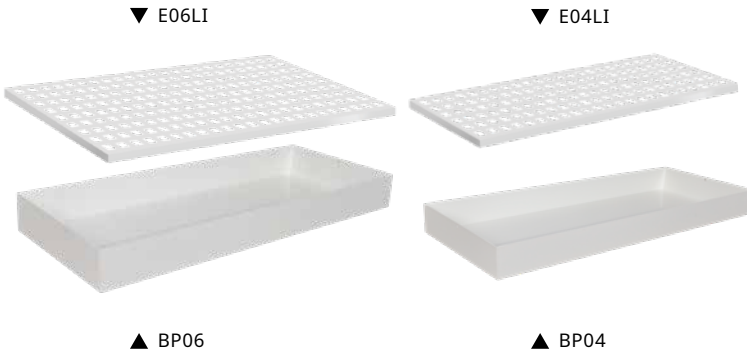
P/N	Description	Weight (kg)	Corresponding cabinets
E04Li	Perforated shelf (depth 450)	3	S804LI et S2004LI
E06Li	Perforated shelf (depth 600)	3,5	S806LI et S2006LI
GL04	Containment sump (depth 450)	4	S804LI et S2004LI
GL06	Containment sump (depth 600)	5	S806LI et S2006LI
EX100LI	Fire extinguisher with automatic triggering at 79°C per thermal bulb for lithium	2	S804LI et S806LI
EX200LI	Fire extinguisher with automatic triggering at 79°C per thermal bulb for lithium	3	S2004LI et S2006LI
VIG190	Security and alarm package including visual and audible alarm, control box, self-activating smoke detector, EX100LI fire extinguisher and cable duct	5	S804LI et S806LI
VIG290	Security and alarm package including visual and audible alarm, control box, self-activating smoke detector, EX200LI fire extinguisher and cable duct	6	S2004LI et S2006LI
PEXTBALI50	Cable entry hole with fire-resistant cable entry at the bottom (max. 4 cables)	-	All models
PINTOLI	Internal cable duct at the top	-	All models
PRISELI	Rack of 9 electrical outlets (250 volts - 4000 watts - 16 amps)	2	All models
PRISELICC	Rack of 6 electrical outlets equipped with a thermal-magnetic circuit breaker	-	All models
ONDULI	4-socket safety inverter for VIG190 or VIG290 only (H 90 x W 163 x D 245 mm - 230 volts - 300 watts - 500 volts)	3,5	All models

## ACCESSORIES TO EQUIP YOUR CABINET

### SHELVES & CONTAINMENT SUMP



Ref.	Description	Weight (kg)
E48LI	Perforated shelf for models 798+LI and 794+LI	5
E35LI	Perforated shelf for models 793+LI and 795+LI	7
B148	Containment sump for models 798+LI and 794+LI	5
B235	Containment sump for models 793+LI and 795+LI	10



Ref.	Description	Weight (kg)
E04LI	Perforated shelf for models S804LI et S2004LI	3
E06LI	Perforated shelf for models S806LI et S2006LI	3,5
BP04	Containment sump for models S804LI et S2004LI	4
BP06	Containment sump for models S806LI et S2006LI	5

### ADVANCED SECURITY SOLUTIONS

#### ▼ VIG190 - Set of security and alarm including (or VIG290) :



Visual and sound alarm



Control box



Automatic smoke detector



Fire extinguisher EX100LI (or EX200LI)



Cable pass-through PINTOLI

#### ▼ Additional equipment



SERCODE



PRISELI



ONDULI



EX100LI or EX200LI



PEXTBALI

# VENTILATION OF YOUR CABINET

## ESSENTIAL ACCESSORY TO IMPROVE THE SECURITY OF YOUR CABINET

We strongly recommend that you add a ventilation or filtration box to your safety cabinet. The box extracts the stagnant vapors contained in your cabinet and renews the air, thus reducing internal overheating.



▲ CDV-A



▲ CDV-A + option KRC + option KL100 + option CDS100



▲ KRC

### THE CDV-A VENTILATION BOX

Connected to the cabinet using a connection kit (ref. KRC); the fan included in this box allows the extraction of toxic vapors generated in the cabinet and sucked outside the building via a wall outlet to be created.

P/N	Description	Dimensions H x W x D (mm)	Weight (kg)
CDV-A	Steel ventilation box	235 x 260 x 245	8
KRC	Connection kit for box	-	1
KL100	Hose diam. 100 mm, per metre	-	0,2
CHJ	Steel connection sleeve diam. 100 mm	-	0,1
CDS100	Clamp diam. 100 mm	-	-

### THE RIGHT QUESTIONS TO ASK

- What is the composition of the fire extinguisher ?**  
 Metal fires, and particularly lithium, are extremely difficult to stop. Nevertheless, the technology developed by our experts use an assembly of potassium nitrate and polyepoxide to act on the lithium fire.
- Is it dangerous for humans ?**  
 No, but it is of course recommended to properly ventilate in order to remove stale air.
- How long does the fire extinguisher last and when should it be changed ?**  
 The fire extinguisher does not require any specific maintenance during its lifespan of approximately 15 years.
- How does a smoke detector work ?**  
 It is an optical smoke detector, an electric voltage is applied to the terminals of the electrodes, generating a current caused by ionization of the air in the chamber. When the smoke particles enter inside, the intensity of the current is disturbed, which then triggers the detector alarm.
- What is the volume of the alarm in decibel ?**  
 3 sound levels are possible depending on the connection made. We chose the most intense, at 109 db (A).

# RISKS ASSOCIATED WITH LITHIUM-ION BATTERIES

## WHAT IS A LITHIUM-ION BATTERY?

A Li-ion battery, or Li-ion accumulator, consists of two electrodes (cathode and anode) and an electrolyte that ensures the ion exchange of the system.

During the discharge (use) of the battery, ions move from the anode to the cathode. During charging, the reverse occurs. These two electrodes are insulated by a separator to prevent a short circuit.

## WHAT ARE THE DANGERS ASSOCIATED WITH THESE BATTERIES?

Of the 50 potential accidental scenarios identified by INERIS (Institut National de l'Environnement Industriel et des Risques) during the various stages of the battery life cycle, 12 were considered critical. They concern in particular the storage, recharging and use stages. The most problematic outcome of these risks concerns battery fire (or metal fire). This is a significant risk because the fire caused by lithium-ion batteries cannot be extinguished in a conventional way, as the battery itself generates the oxygen molecules and heat needed for combustion. It can only be extinguished with the help of special powders, all in a confined environment (with the risk of the powder losing its effectiveness).

## HOW DO THESE BATTERY FIRES ORIGINATE?

### By thermal runaway due to overcharging or exposure to excessive temperatures

A battery usually delivers the chemically stored energy on discharge as electrical energy. However, not all of the energy may be delivered as electrical energy, but may cause overheating that can be as much as 7 to 11 times the electrically stored energy. Given the structure of the battery, the reaction itself becomes stronger and causes critical overheating. The materials of the battery also release bound oxygen, which further fuels the fire.

### By full discharge

The full discharge associated with not using the battery for too long periods can damage the battery. If the battery is then exposed to temperatures that are too cold, this can cause a change in the physical and chemical properties of the electrolyte liquid and lead to the formation of flammable gas. The absence of the liquid breaks down the protection of the battery, leading to a short circuit or fire.

### By mechanical damage

Shocks or misuse can damage the internal structure of the battery and lead to deterioration of the battery separator, leading to a short circuit or fire.

## HOW TO STORE THEM SAFELY?

Storage recommendations depend on the size and power of the battery:

### Low power lithium batteries (less than 100 Wh per battery)

Those are the small batteries contained in mobile phones or computers, for example.

No special safety requirements apply here, as long as all the manufacturer's instructions and safety locations are followed.

For larger quantities stored (volume over 7 m<sup>3</sup>) the guidelines for medium capacity lithium batteries applies.

### Medium capacity lithium batteries (approx. 100 Wh per battery and 12 kg gross per battery)

Batteries in this category are used in electric bicycles, electric scooters or similar small vehicles. They should be stored in separate fire-resistant enclosures (e.g. a fireproof room or safety cabinet).

They should not be stored with other products and this area should be constantly monitored.

For larger quantities stored (area occupied at 60 m<sup>2</sup>) the guidelines for high power lithium batteries applies.

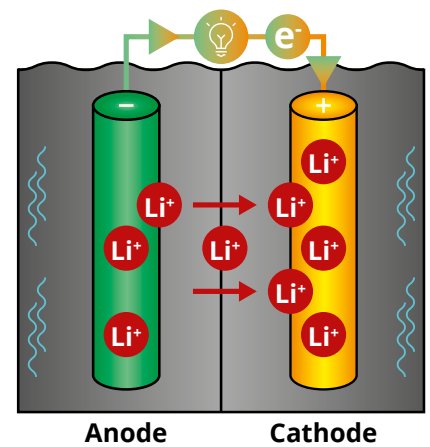
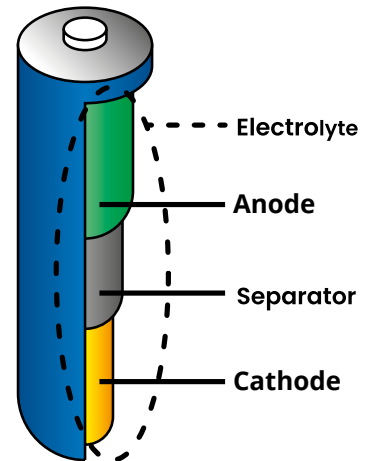
### High capacity lithium batteries (more than 100 Wh per battery and 12 kg gross per battery)

Batteries in this category are mainly used in electric cars and large stand-alone appliances.

The recommendations for the storage of medium power batteries should form the basis for consideration. However, safeguards should be put in place on a case-by-case basis after consideration.

- If the storage space is large, fire protection must be adapted.
- If the use of sprinklers is allowed, it should be as localised as possible and it is recommended that the batteries are separated and stored in a confined environment to prevent a fire outbreak.

Contact us for more informations at [info@aleph-tech.it](mailto:info@aleph-tech.it)



Top, components of a Li-ion battery.  
Below, how a Li-ion battery works in use.

