

# 105 MINUTES SECURITY CABINETS FOR LITHIUM-ION BATTERY STORAGE



**EC+SAFE**  
[www.ecosafesa.com](http://www.ecosafesa.com)



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



Visual and sound alarm box (VIG290)



Sound and visual alarm (VIG290)



Smoke detector (VIG290)

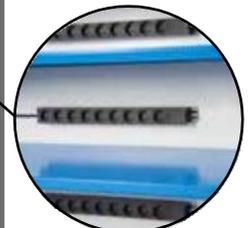


Automatic fire extinguisher (EX200LI) included with VIG290



Moving by pallet truck (empty)

795+LI + 4 x E35LI + B235 + VIG290 + 3 PRISELI



PRISELI racks and shelves (E35LI)

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 which can be due to 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 most varied storage needs.

These cabinets can be equipped as needed, with perforated shelves (with high load capacity - 100kg per level) and retention trays 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 use, according to your needs :

- **Simple battery storage** : Cabinet equipped with perforated shelves and a retention tray.
- **Storage and charging of batteries** : Cabinet equipped with perforated shelves, a retention tray and electrical outlet racks + PEXTABLI (cable pass-through).
- **Simple battery storage + advanced protection system**: Cabinet equipped with perforated shelves with a retention tray + 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 retention tray 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 retention tank 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.

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

## TECHNICAL CHARACTERISTICS OF THE RANGE

### Conformity :

- Proven fire resistance of 105 minutes, according to the ISO 834 curve as per the EN 14470-1 standard
- Standardized pictograms in accordance with 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

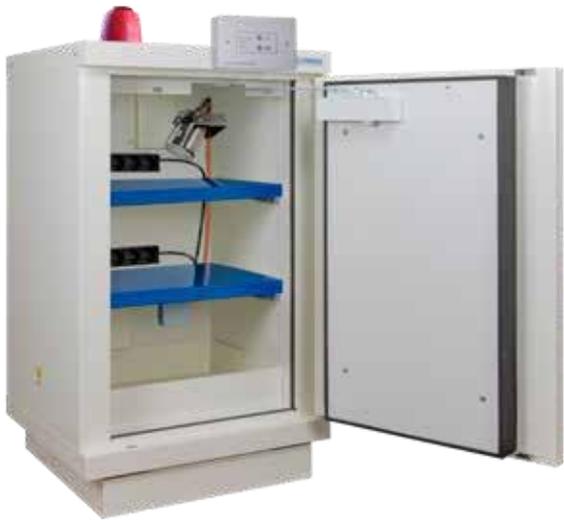
### Optional accessories

- Perforated shelves with a load capacity of 100 kg (ref. E34LI and E35LI)
- Removable retention tray 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.

Please refer to our "Ventilation" chapter on the last page for further details.



	798+LI
Number of doors	1
Type of doors	Swinging
Doors closure	Automatic
Perforated shelves	Optional
Retention tray in steel	Optional
Integrated fire extinguisher	Optional
Outside dimensions H x W x D (mm)	1100 x 635 x 670
Inside dimensions H x W x D (mm)	820 x 490 x 410
Weight (kg)	182

□ 798+LI + 2 x E48LI + B148 + VIG190 + 2 PRISELI

Ref.	Description	Weight (kg)
798+LI	Cabinet counter 90-minutes fire-resistant with 1-door for lithium batteries, to equip	182
798+LIA3	Cabinet counter 90-minutes fire-resistant with 1-door for lithium batteries equipped with 3 shelves E48LI + 1 fire extinguisher (EX100LI)	184
798+LIX3	Cabinet counter 90-minutes fire-resistant with 1-door for lithium batteries equipped with 3 shelves E48LI + 1 x VIG190 (visual and sound alarm, control box, automatic smoke detector, fire extinguisher EX100LI and cable pass-through in the upper part of the cabinet [ref. PINTOLI])	187



	794+LI
Number of doors	1
Type of doors	Swinging
Doors closure	Automatic
Perforated shelves	Optional
Retention tray in steel	Optional
Integrated fire extinguisher	Optional
Outside dimensions H x W x D (mm)	1950 x 635 x 620
Inside dimensions H x W x D (mm)	1620 x 490 x 410
Weight (kg)	287

□ 794+LI + 4 x E48LI + B148 + VIG190 + 4 PRISELI

Ref.	Description	Weight (kg)
794+LI	High cabinet 1 door 90-minutes fire-resistant for lithium batteries, to equip	287
794+LIA4	High cabinet 1 door 90-minutes fire-resistant for lithium batteries equipped with 4 shelves E48LI + 1 fire extinguisher (EX100LI)	289
794+LIX4	High cabinet 1 door 90-minutes fire-resistant for lithium batteries equipped with 4 shelves E48LI + 1 x VIG190 (visual and sound alarm, control box, automatic smoke detector, fire extinguisher EX100LI and cable pass-through in the upper part of the cabinet [ref. PINTOLI])	292



▫ 793+LI + 2 x E35LI + B235 + VIG190 + 2 PRISELI

	793+LI
Number of doors	2
Type of doors	Swinging
Doors closure	Automatic
Perforated shelves	Optional
Retention tray in steel	Optional
Integrated fire extinguisher	Optional
Outside dimensions H x W x D (mm)	1100 x 1137 x 670
Inside dimensions H x W x D (mm)	820 x 1000 x 410
Weight (kg)	297

Ref.	Description	Weight (kg)
793+LI	Cabinet counter 90-minutes fire-resistant with 2-doors for lithium batteries, to equip	297
793+LIA3	Cabinet counter 90-minutes fire-resistant with 2-doors for lithium batteries equipped with 3 shelves E35LI + 1 fire extinguisher (EX100LI)	299
793+LIX3	Cabinet counter 90-minutes fire-resistant with 2-doors for lithium batteries equipped with 3 shelves E35LI + 1 x VIG190 (visual and sound alarm, control box, automatic smoke detector, fire extinguisher EX100LI and cable pass-through in the upper part of the cabinet [ref. PINTOLI])	302



▫ 795+LI + 5 x E35LI + B235 + VIG290 + 4 PRISELI

	795+LI
Number of doors	2
Type of doors	Swinging
Doors closure	Automatic
Perforated shelves	Optional
Retention tray in steel	Optional
Integrated fire extinguisher	Optional
Outside dimensions H x W x D (mm)	1950 x 1137 x 620
Inside dimensions H x W x D (mm)	1620 x 1000 x 410
Weight (kg)	453

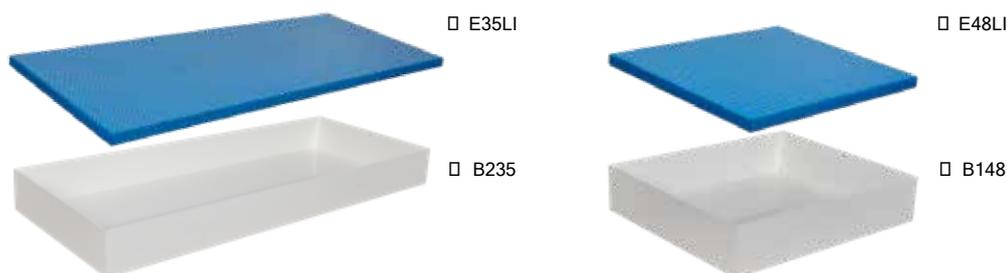
Ref.	Description	Weight (kg)
795+LI	High cupboard 2 doors 90-minutes fire-resistant for lithium batteries, to equip	453
795+LIA4	High cupboard 2 doors 90-minutes fire-resistant for lithium batteries equipped with 4 shelves E35LI + 1 fire extinguisher (EX200LI)	455
795+LIX4	High cupboard 2 doors 90-minutes fire-resistant for lithium batteries equipped with 4 shelves E35LI + 1 x VIG290 (visual and sound alarm, control box, automatic smoke detector, fire extinguisher EX200LI and cable pass-through in the upper part of the cabinet [ref. PINTOLI])	457

## ACCESSORIES TO EQUIP YOUR CABINET

Your cabinet is delivered without interior fittings. We offer you various equipment, according to your needs.

### BATTERIES STORAGE

We suggest perforated shelves and retention trays for the storage of batteries.



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	Retention tray for models 798+LI and 794+LI	5
B235	Retention tray for models 793+LI and 795+LI	10

### 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)



□ PINTOLI cable pass-through



□ SERCODE



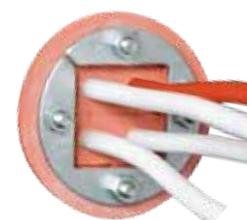
□ PRISELI



□ ONDULI



□ EX100LI or EX200LI



□ PEXTBALI

Ref.	Description	Weight (kg)
EX100LI	79°C Special Lithium Battery Automatic Fire Extinguisher with thermal bulb	2
EX200LI	79°C Special Lithium Battery Automatic Fire Extinguisher with thermal bulb for 795+LI	3
VIG190	Set of security and alarm including visual and sound alarm, control box, automatic smoke detector, fire extinguisher EX100LI and cable pass-through	5
VIG290	Set of security and alarm including visual and sound alarm, control box, automatic smoke detector, fire extinguisher EX200LI and cable pass-through for 795+LI	6
PEXTBALI	Drilling for cable passage with fire-resistant cable pass-through at the bottom (max. 4 cables)	-
PINTOLI	Internal cable pass-through in the upper part	-
PRISELI	Rack of 9 electrical outlets (250 volts - 4000 watts - 16 amperes)	-
ONDULI	4-outlet safety inverter for VIG190 only (H 90 x W 163 x D 245 mm - 230 volts - 300 watts - 500 volt-amps)	3,5
SERCODE	Code lock with numbers	-

# VENTILATION OR FILTRATION 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.

### 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.

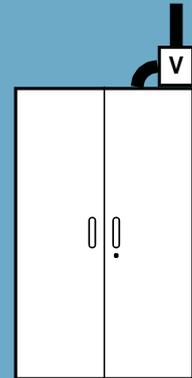
Ref. : CDV-A



□ CDV-A



□ KRC



The cabinet is connected to the box ventilation system, which itself is connected to a wall outlet.

Ref.	Description	Weight (kg)
CDV-A	Ventilation box in steel	8
KRC	Connecting kit for box	1
KL100	Flexible tube diameter 100mm, per meter	0,2
CHJ	Connecting sleeve in steel diameter 100mm	0,1
CDS100	Clamp diameter 100mm	0,01

## QUESTIONS / ANSWERS

### 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 ?

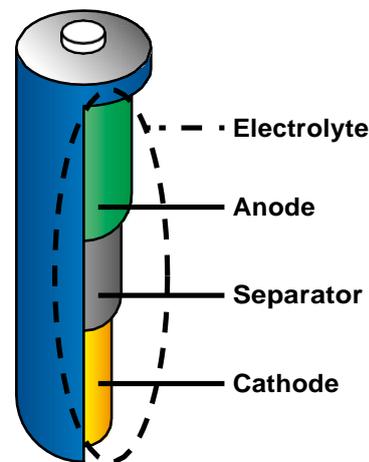
3 sound levels are possible depending on the connection made. We chose the most intense, at 109 db (A).

## RELATED RISKS WITH LITHIUM-ION BATTERIES

### A LITHIUM-ION BATTERY, WHAT IS IT ?

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

During discharge (use) of the battery, the ions pass from the anode to the cathode. During charging the reverse occurs. These two electrodes are isolated by a separator that prevents a short circuit.



### WHAT ARE THE DANGERS RELATED TO THESE BATTERIES ?

Among the 50 potential accident scenarios identified by INERIS (National Institute of Industrial and Risk Environment) throughout the various stages of the batteries life cycle, 12 were considered critical.

They notably relate to the storage, charging and use steps. The most problematic consequence of those risks are battery fire (or metal fire).

This is a significant risk because the fire caused by lithium-ion batteries cannot be put out in a conventional way, the battery itself generating the oxygen molecules and heat necessary for combustion. It can then only be switched off with the help of special powders, all in a confined environment (at the risk of the powder losing its efficiency).

### WHERE DOES THOSE BATTERY FIRES COME FROM ?

- **By thermal runaway due to overload or exposure to excessive temperatures**

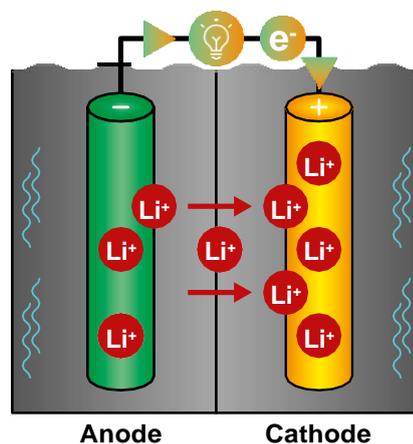
A battery usually supplies the energy stored chemically during discharge in the form of electrical energy. However, it may be that not all the energy is supplied as electrical power, thus causes overheating that can reach up to 7 to 11 times the energy stored electrically. Given the structure of the battery, the reaction itself strengthens and causes critical overheating. The materials that make up the battery also releases bound oxygen, which further fuels the fire.

- **By complete discharge**

Complete discharge due to the non-use of the battery for too long periods of time can damage the battery. If it is then exposed to temperatures that are too cold, it can cause decomposition of the electrolyte liquid and the formation of inflammable gases. The absence of liquid breaks the battery protection, 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 a fire.



On the top, components of a Li-ion battery.

On the bottom, principle of operation of a Li-ion battery when in use

### HOW TO STORE THEM SAFELY ?

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

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

These are the small batteries contained in cellphones or computers for example. No special safety regulations apply here, in the way that all the manufacturer's instructions and safety locations are respected. For larger stored quantities (volume greater than 7 m<sup>3</sup>) the indications for lithium batteries of medium power apply.

- **Medium-power lithium batteries** (more than 100 Wh per battery and 12 kg gross weight per battery)

Batteries in this category are used in electric bicycles, electric scooters, electric vehicles or various similar small vehicles.

Those must be stored in separate fire resistant enclosures (e. g. a fire room or a safety cabinet). They must not be stored with other products and this area must be the subject of constant monitoring. For larger stored quantities (area occupied at 60 m<sup>2</sup>) the indications for high-power lithium batteries apply.

- **High-power lithium batteries** (100 Wh per battery and 12 kg gross per battery)

Batteries in this category are mainly used in electric cars as well as in large stand-alone devices. Recommendations for the storage of medium-power batteries shall constitute the basis for reflection. However, securities must be implemented in a case by case after study. If the storage space is large, fire protection must be adapted. If the use of sprinklers is allowed, it must be as localized as possible and we will recommend separating the batteries and storing them in a confined environment that is able to prevent a fire.

#### ECOSAFE HQ

Tel. : +41 (0)21 694 10 04  
 Fax : +41 (0)21 694 10 00  
 Chemin des Champs Courbes 15  
 Zone Industrielle de Vallaire Est  
 1024 - Ecublens - Switzerland

#### ECOSAFE ASIA

Tel. : +852 3919 5812  
 Room TA 18, 6th floor  
 Woon Lee Commercial Building  
 N° 7-9 Austin Avenue  
 Tsim Sha Tsui - Hong Kong S.A.R.

#### ECOSAFE ITALY

Stefano Di Leo (Sales Director)  
 Tel. : +41 (0)21 694 10 05  
 stefanodileo@ecosafesa.com  
 Via Vincenzo Monti 74  
 20832 Desio (MB) - Italy