

Safe solutions for active charging and passive storage

# LITHIUM BATTERIES

NOT AS HARMLESS AS THEY SEEM





**PRESTON  
PHIPPS**

Since // Depuis 1933

Preston Phipps only partners with industry-leading manufacturers. We are especially proud of our long-term relationship with Asecos. Asecos is the world's leading manufacturing for safety storage cabinets for flammables and compressed gas cylinders. Asecos cabinets are first class quality made in Germany. Their success in such types of safety cabinets led them to design a version specifically for Lithium-ION batteries. Together with Preston Phipps, a North American version was developed to comply to all local safety and fire code regulations.

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## EXPERTISE LITHIUM-ION BATTERIES

With the worldwide development of devices that are powered by Lithium-ION batteries, the risks and dangers of accidents are becoming more and more important.



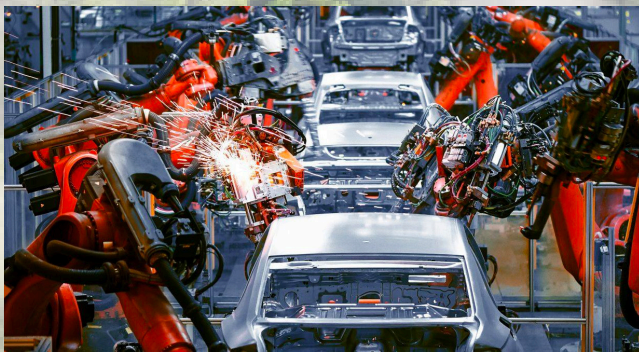
Today, it is common to hear about people that are either injured or have perished from a lithium-ION battery incident. Property damage is sometimes catastrophic where fires burn for several days and after they are extinguished, can even reignite.

When incorrectly stored, lithium-ION batteries can pose a major fire and explosion hazard. Under certain circumstances damaged batteries can sometimes spontaneously ignite.

Charging and storage regulations are still very vague. Although European regulations have advanced, North America has been slow to react on making proper recommendations and impose laws that protect people and properties.

The technology is ready and there is no need to wait for the next disaster to happen. Asecos has the expertise and we have tested and developed the safest solution for storing and charging Lithium-ION batteries.

**Lithium-ION batteries found in many popular consumer products, municipalities, manufacturing, health facilities, hospitalities and more.**



## LITHIUM-ION BATTERIES NOT AS HARMLESS AS THEY SEEM

Despite these concerns, lithium-ION batteries continue to be prevalent in many of today's most popular gadgets. With the increasing use of lithium-ION batteries, the dangers related to storing and charging are increasing.

Laws will eventually come into place, but in the meantime, we need solutions to minimize the risk and avoid fatalities.

**Recommendation of North American Agencies:**

*“Lithium-ION batteries should generally be treated as a hazardous material”.*

*Environmental Protection Agency*

*Unlike standard alkaline batteries, most lithium-ION batteries manufactured today contain a flammable electrolyte and have an incredibly high energy density. They can overheat and ignite under certain conditions, such as a short circuit, physical damage, improper design, or assembly. Once ignited, lithium-ION cell and battery fires can be difficult to extinguish.*

*—US Department of Transportation*

*A battery fire can also generate chemical gases that can potentially cause an explosion if they are not properly vented. Storing lithium-ION batteries in a regulated storage cabinet keeps all hazardous toxins contained.*

*—Travelers Insurance*

*“Lithium-ion batteries are increasingly found in devices and systems that the public and first responders use or interact with daily. While these batteries provide an effective and efficient source of power, the likelihood of them overheating, catching on fire, and even leading to explosions increases when they are damaged or improperly used, charged, or stored.”*

*—NFPA (National Fire Protection Agency)*

*“Handle lithium-ION batteries carefully. **Do not** throw, modify, or tamper with them. Check for signs of damage. Keep your batteries in a safe place, out of sight and reach from children. If you carry batteries with you, keep them in a protective, non-metal case” **Do not** charge your battery for longer than the recommended charging time. Overcharging can cause your battery to overheat, which can lead to fires or explosions.*

*“Charge your battery **before** it drops below 30% to help it last longer and work safely. **Do not** keep it plugged in and charged at 100% for long periods. Unlike older types of batteries, you do not need to fully discharge lithium-ION batteries. This may harm them. Charge your product away from exit doors in case of fire.”*

*—Canadian Government,  
Health Canada*

*In all of these fires, the lithium-ION fires, it is not a slow burn; there's not a small amount of fire, it literally explodes. It's a tremendous volume of fire as soon as it happens, and it's very difficult to extinguish and so it's particularly dangerous.”*

*—FDNY Commissioner*

*Batteries should be stored in a well-ventilated, dry area kept between 40 and 80 degrees Fahrenheit. They should be stored away from direct sunlight, heat sources, and water. Batteries should be stacked so that they're stable and won't be bumped, knocked over or otherwise damaged.*

*—Safety Skills, an HSI Company*

# WORLD NEWS



April 25

## Lithium-ion battery fire rages in Jacksonville, FL

A Lithium-ion battery fire inside a factory in Jacksonville, FL, on April 25th. HazMat crews worked on the fire for hours, and nearby batteries as to avoid an explosion.



April 26

## Large lithium-ion container fire in Sweden only a day later

On April 26, a large amount of lithium-ion batteries stored in a shipping container in Sweden created a similar situation to the one in Jacksonville.



## Concerns over growing number of fires linked to lithium-ion batteries

**More than 450 fires have been linked to lithium-ion batteries**

In Australia, more than 450 fires have been linked to lithium-ion batteries over the past 18 months, according to data provided by state fire departments.

Most states only started tracking incidents involving lithium-ion batteries in recent years, however, Western Australia recorded 81 of these incidents last year, compared



with 21 in 2018.

Fire and Rescue New South Wales said it responded to about 180 lithium-ion battery-related fires in the past 12 months, Victoria had 120 in the year to July, and Queensland had recorded 72 since 2021.

The latter figure included an e-scooter that caught fire at a Brisbane house last week and five people were hospitalized.



Charred remains of e-bikes and scooters sit outside of a building in Chinatown after four people were killed by a fire in an e-bike repair shop overnight on June 20, 2023 in New York City. PHOTO BY SPENCER PLATT/Getty Images

## 2024

### Why do EV and e-bike batteries keep catching on fire?

An overheating e-bike on board a TTC subway car led to a fire at the Sheppard-Yonge Station on Sunday. A shipment of lithium-ion batteries was also on board Toronto's train.

board Toronto train

# INTERNATIONAL NEWS

★ ONTARIO EDITION

MOSTLY CLOUDY, HIGH 15C ★

## Lithium-Ion Battery Fires Double Since 2022

The number of lithium-ion battery fires in Toronto has nearly doubled this year, Toronto Fire Services (TFS).

These batteries can be found in smartphones, laptops, toys and e-bikes. In 2022, TFS said it had to deal with 29 batteries, but this year, that number has jumped to 51.

In some cases, it's unknown what caused the fires, but TFS Deputy Chief Larry Cocco told CTV News that these blazes occur when the batteries have been misused or overcharged.

"These batteries have a lot of energy in a small package, and when they fail, it goes into something called thermal runaway," said Cocco. "It's why we highly recommend not overcharging your device. Once it reaches capacity, unplug it and don't charge devices unattended."



Agnieszka Sajka of Toronto said her family had a terrible scare this past June. Her two children were riding in their battery-powered toy car when it started to smoke and burst into flames.

"Sometimes kids are playing far away from their parents, but thank goodness I was right there because I feel it could have been much worse," said Sajka.

Sajka called the fire department, and she said

the fire was put out, and the car was destroyed. The company Sajka bought the vehicle from offered her compensation, but she said she would not buy another one.

"I'm never going to get a toy like this with a big battery in it ever again. You never realize that your children could be in such danger playing with toys and things that could change so

239/8

THE NEWS AND WORLD REPORT

STOCKS FALL AS CORPORATE FEUDS ENSUE

# BREAKING NEWS



## Lithium-ion battery blamed for yet another fast-moving fire, New York City officials say

A lithium-ion battery sparked yet another fast-moving fire, this one in New York City on Sunday, leveling a supermarket and neighboring laundromat, authorities said.

Firefighters had water on five-minute-old flames inside Concourse Food Plaza, about 2 miles north of Yankee Stadium in the Bronx, but the blaze was already out of control, officials said.



# THE HAZARDS

## THE THERMAL RUNAWAY

Mechanical damage	Deep discharge	Thermal overload	Electrical overload
In combination with the high energy density of the battery 	Unusable cell 	Caused by external heat or energy sources 	During charging and discharging 

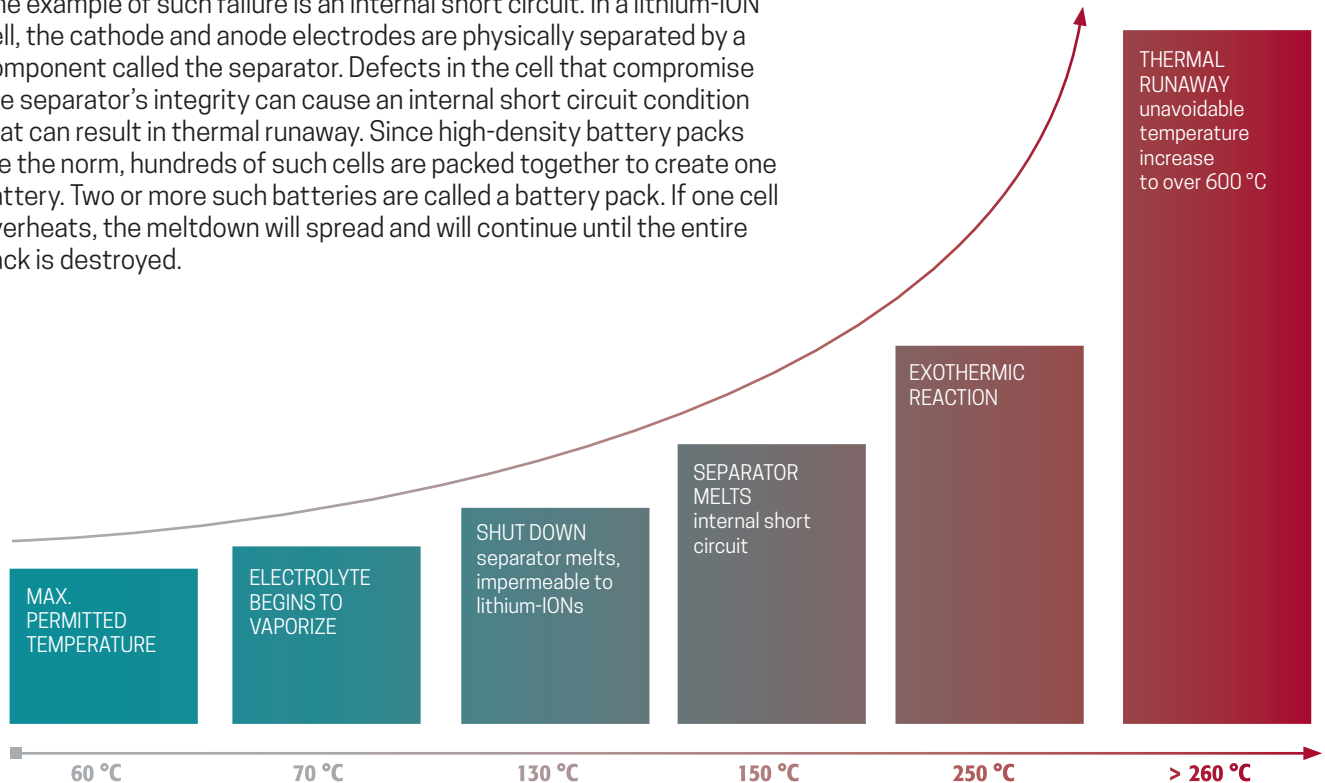
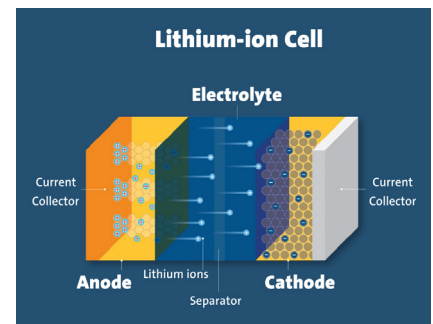
### What is thermal runaway?

One of the primary risks related to lithium-ION batteries is thermal runaway. Thermal runaway is a phenomenon in which the lithium-ION cell enters an uncontrollable, self-heating state. Thermal runaway can result in extremely high temperatures, violent cell venting, smoke and fire.

### What causes thermal runaway?

Faults in a lithium-ION cell can result in a thermal runaway. These faults can be caused by internal failure or external conditions.

One example of such failure is an internal short circuit. In a lithium-ION cell, the cathode and anode electrodes are physically separated by a component called the separator. Defects in the cell that compromise the separator's integrity can cause an internal short circuit condition that can result in thermal runaway. Since high-density battery packs are the norm, hundreds of such cells are packed together to create one battery. Two or more such batteries are called a battery pack. If one cell overheats, the meltdown will spread and will continue until the entire pack is destroyed.



# LITHIUM-ION BATTERIES

## BASIC SAFETY GUIDELINES

Below are some guidelines that will assist in incorporating lithium-ION battery safety into an employer's safety and health program.

- ▶ Ensure lithium-ION batteries, chargers, and associated equipment are tested in accordance with an appropriate test standard. It is important to use charges that have the following certifications.



- ▶ Follow manufacturer's instructions for storage, use, charging, and maintenance.
- ▶ When replacing batteries and chargers for an electronic device, ensure they are specifically designed and approved for use with the device, and they are purchased from the device's manufacturer.
- ▶ Remove lithium-ION-powered devices and batteries from the charger once they are charged. Never overcharge or alter a battery in any way.
- ▶ Store lithium-ION batteries and devices in dry, cool locations.

- ▶ Inspect the batteries for signs of damage, such as bulging/cracking, hissing, leaking, rising temperature, and smoking. Immediately remove a device or battery from service and place it in an area away from flammable materials if any of these signs are present.
- ▶ If batteries are damaged, remove them from service, and dispose of them in accordance with local regulations. Contact a local battery recycling center for disposal instructions.



### CONCLUSION

Store and charge lithium-ION batteries in a safety storage cabinet!

# THE CABINETS

## AND THEIR FEATURES AT A GLANCE



CABINET FEATURES/MODEL	ION-S	ION-SDA	ION-SDAC	ION-SDA-PRO	ION-SDAC-PRO	ION-SDAC-FS
90 min fire resistance from the outside	✓	✓	✓	✓	✓	✓
90 min fire resistance from the inside	✓	✓	✓	✓	✓	✓
Self-closing doors	✓	✓	✓	✓	✓	✓
Evacuatable from site	✓	✓	✓	✓	✓	✓
Safe lithium-ION battery storage	✓	✓	✓	✓	✓	✓
Safe lithium-ION battery charging			✓		✓	✓
Temperature detection		✓	✓	✓	✓	✓
Smoke detection		✓	✓	✓	✓	✓
Fire suppression system				✓	✓	✓
Alarming - visual & auditive		✓	✓	✓	✓	✓
Monitoring of all components				✓	✓	
Testing mode				✓	✓	
BMS communication				✓	✓	
Compliance with US and CAN fire code	✓	✓	✓	✓	✓	✓

MODEL FROM PAGE 9

MODEL FROM PAGE 10

MODEL FROM PAGE 11

MODEL FROM PAGE 12

MODEL FROM PAGE 13

MODEL FROM PAGE 14





## MODEL ION-S FEATURES

### GENERAL FEATURES

- Lithium-ION battery storage
- 90 MINUTES FIRE PROTECTION: Internal → External & External → Internal
- Triple hinged door; scratch and impact resistant surface
- Door mechanics outside the storage compartment area for increased protection
- Self-closing door with integrated automatic thermal release system (intumescent sealant)
- Keyhole with cylinder lock and locking state indicator (green/red)
- Integrated open base to facilitate transportation “quick-lift”

### SIZE & CONFIGURATION

#### Single Door with Cabinet

Exterior Dimensions:  
599 W x 615 D x 1953 H (mm)  
23-9/19 W x 24-1/4 D x 76-7/8 H (inches)



#### Double Door with Cabinet

Exterior Dimensions:  
1193 W x 615 D x 1953 H (mm)  
47 W x 24-1/4 D x 76-7/8 H (inches)



#### Undermount Cabinet / Installation Under Work Surfaces

Exterior Dimensions:  
593 W x 574 D x 781 H (mm)  
23-3/8 W x 22-10/16 D x 30-3/4” H (inches)





## MODEL ION-SDA FEATURES

### GENERAL FEATURES

- Lithium-ION battery storage
- 90 MINUTES FIRE PROTECTION: Internal → External & External → Internal
- Triple hinged door; scratch and impact resistant surface
- Door mechanics outside the storage compartment area for increased protection
- Self-closing door with integrated automatic thermal release system (intumescent sealant)
- Keyhole with cylinder lock and locking state indicator (green/red)
- Integrated open base to facilitate transportation “quick-lift”



### SIZE & CONFIGURATION

#### Single Door with Cabinet

Exterior Dimensions:  
599 W x 615 D x 1953 H (mm)  
23-9/19 W x 24-1/4 D x 76-7/8 H (inches)



#### Double Door with Cabinet

Exterior Dimensions:  
1193 W x 615 D x 1953 H (mm)  
47 W x 24-1/4 D x 76-7/8 H (inches)





## MODEL ION-SDAC FEATURES

### GENERAL FEATURES

- Lithium-ION battery storage
- 90 MINUTES FIRE PROTECTION: Internal → External & External → Internal
- Triple hinged door; scratch and impact resistant surface
- Door mechanics outside the storage compartment area for increased protection
- Self-closing door with integrated automatic thermal release system (intumescent sealant)
- Keyhole with cylinder lock and locking state indicator (green/red)
- Integrated open base to facilitate transportation “quick-lift”

### SIZE & CONFIGURATION

#### Single Door with Cabinet

Exterior Dimensions:  
599 W x 615 D x 1953 H (mm)  
23-9/19 W x 24-1/4 D x 76-7/8 H (inches)



#### Double Door with Cabinet

Exterior Dimensions:  
1193 W x 615 D x 1953 H (mm)  
47 W x 24-1/4 D x 76-7/8 H (inches)





## MODEL ION-SDA-PRO FEATURES

### GENERAL FEATURES

- Lithium-ION battery storage
- 90 MINUTES FIRE PROTECTION: Internal → External & External → Internal
- Triple hinged door; scratch and impact resistant surface
- Door mechanics outside the storage compartment area for increased protection
- Self-closing door with integrated automatic thermal release system (intumescent sealant)
- Keyhole with cylinder lock and locking state indicator (green/red)
- Integrated open base to facilitate transportation “quick-lift”

### SIZE & CONFIGURATION

#### Single Door with Cabinet

Exterior Dimensions:  
599 W x 615 D x 1953 H (mm)  
23-9/19 W x 24-1/4 D x 76-7/8 H (inches)



#### Double Door with Cabinet

Exterior Dimensions:  
1193 W x 615 D x 1953 H (mm)  
47 W x 24-1/4 D x 76-7/8 H (inches)



- 1 Smoke Detection 
- 2 Heat Detection 
- 3 Audible & Visual Alarm 
- 4 Fire Suppression System 
- 5 Monitoring of Fire Protection System 
- 6 BMS Communication 
- 7 Testing Mode 
- 8 Compliance With US and CAN Fire Code 



## MODEL ION-SDAC-PRO FEATURES

### GENERAL FEATURES

- Lithium-ION battery storage
- 90 MINUTES FIRE PROTECTION: Internal → External & External → Internal
- Triple hinged door; scratch and impact resistant surface
- Door mechanics outside the storage compartment area for increased protection
- Self-closing door with integrated automatic thermal release system (intumescent sealant)
- Keyhole with cylinder lock and locking state indicator (green/red)
- Integrated open base to facilitate transportation “quick-lift”

### SIZE & CONFIGURATION

#### Single Door with Cabinet

Exterior Dimensions:  
599 W x 615 D x 1953 H (mm)  
23-9/19 W x 24-1/4 D x 76-7/8 H (inches)



#### Double Door with Cabinet

Exterior Dimensions:  
1193 W x 615 D x 1953 H (mm)  
47 W x 24-1/4 D x 76-7/8 H (inches)



- Smoke Detection
- Heat Detection
- Audible & Visual Alarm
- Fire Suppression System
- Monitoring of Fire Protection System
- BMS Communication
- Testing Mode
- Compliance With US and CAN Fire Code
- Power Charging 120 VAC-15AMP



## MODEL ION-SDAC-FS FEATURES

### GENERAL FEATURES

- Lithium-ION battery storage
- 90 MINUTES FIRE PROTECTION: Internal → External & External → Internal
- Triple hinged door; scratch and impact resistant surface
- Door mechanics outside the storage compartment area for increased protection
- Self-closing door with integrated automatic thermal release system (intumescent sealant)
- Keyhole with cylinder lock and locking state indicator (green/red)
- Integrated open base to facilitate transportation “quick-lift”

### SIZE & CONFIGURATION

#### Single Door with Cabinet

Exterior Dimensions:  
599 W x 615 D x 1953 H (mm)  
23-9/19 W x 24-1/4 D x 76-7/8 H (inches)



#### Double Door with Cabinet

Exterior Dimensions:  
1193 W x 615 D x 1953 H (mm)  
47 W x 24-1/4 D x 76-7/8 H (inches)





## LITHIUM-ION SAFETY STORAGE CABINET FREQUENTLY ASKED QUESTIONS

- 1. How do we know if your facility requires a Lithium-ION storage cabinet ?**  
If you use and charge Lithium-ION batteries as part of your daily operations the cabinet should be part of the safety protocol.
- 2. How many Lithium-ION batteries can you store in a cabinet ?**  
Cabinets should never exceed 2/3 of the allowable internal space and should be placed in a manner that is organized and secure.
- 3. What is the best location for the cabinet ?**  
*As close as possible to an exit door as it is made to be carted out with a lift.*
- 4. Does the L-I cabinet require ventilation to the outdoors ?**  
Not necessary, but the unit can be vented within the building to limit any excess heat buildup in it. Direct outdoor ventilation is not necessary.
- 5. For the models equipped with the charging option, what is the maximum amperage limit ?**  
15-20 amperage draw. Custom charging sizes are available on request.
- 6. What does one do if the monitoring system detects heat or smoke ?**  
Inspect the cabinet by following established safety procedures by your health and safety officer or contact the fire department.
- 7. Is there any government regulation that currently enforce facilities to have a Lithium-ION storage cabinets ?**  
At the moment there are no set regulations on how to properly store and charge Lithium-ION batteries.
- 8. Do insurance companies mandate these types of cabinets ?**  
Not yet, but premiums or franchises can be reduced with the addition of such cabinets due to the 90min guarantee.
- 9. If we decide on the PRO model, can we connect to our existing fire protection system ?**  
Yes, a custom configuration can allow to communicate to an existing system.
- 10. Do Lithium-ION cabinets require yearly certification or maintenance?**  
Yearly validation of all components is strongly recommended.

*asecos*<sup>®</sup>



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