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BATTERY

LITHIUM BATTERY GUIDE

An aerial photograph of a boat's wake in the ocean. The water is a deep, vibrant blue, and the wake is a turbulent, white and light blue trail of churning water that cuts through the surface. The perspective is from directly above, showing the V-shaped path of the boat's movement.

ECOBAT Lithium Battery Guide

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LITHIUM BATTERIES: THE BASICS

Lithium batteries were invented and developed in the 1970s and 80s and have totally changed the way we use many electrical appliances. It's only recently though, that the advantages of lithium battery technology have begun to be available to motorhomers, caravanners, boaters and anyone who relies on 12V batteries for powering appliances.

There are several different types of lithium battery and the ones that are used as auxiliary / leisure batteries are very different indeed from those used in mobile phones and cordless electric tools. These are lithium iron phosphate batteries, often referred to as LiFePO4 batteries.

The long-term value of a lithium battery - If we take the example of an L5 case size (353mm length x175mm width x 190mm height) motorhome battery. An NCC 'B' rated lead acid battery has a retail price of around £120 online and from leisure distributors. This battery would provide approximately 230 cycles at 50% depth of discharge. An NCC 'A' rated AGM technology battery has a retail price of around £150. An AGM battery would provide approximately 700 cycles. The Ecobat lithium EBL100D has a retail price of £579.99, a significantly greater initial investment. However, it will provide over 4000 cycles at 80% depth of discharge.

	'B' Rated battery	'A' Rated battery	EBL100D Lithium
Initial cost	£120	£150	£579.99
Cycles	230	700	4000
Cost per cycle	£0.52	£0.21	£0.14
Life expectancy	3 Years	4 Years	10 Years

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12V Series Lithium Ion Battery

KEY ADVANTAGES OVER TRADITIONAL LEAD-ACID BATTERIES:

- Voltage remains constant for much longer during discharge.
- Much higher charging rate and so faster charging – varies according to the charging system used.
- Can be discharged quickly without damaging the cells, making them ideal for use with inverters.
- Can be discharged as much as 95% on average without damaging the battery.
- Thousands of charging cycles compared to just a few hundred from a typical lead-acid battery.
- Very low rate of self-discharge means they can be left unattended for months.
- Zero maintenance required.
- Approximately 40% - 50% lighter than a good quality lead-acid battery with a similar Ah rating.
- The ability to charge quickly from the vehicle's engine can remove the need for a generator or fuel cell.
- Can be used in almost every situation where a lead-acid battery is being used to power appliances in a motorhome, campervan or caravan.



ECOBAT EBL BATTERIES

The Ecobat 12V lithium-ion phosphate deep cycle batteries are designed as a drop-in replacement for all the batteries with the BCI Group 31 form factor. With the built-in Bluetooth feature (EBL100), you can monitor the battery's state of charge. The RS485 and CANBUS communication protocol allows you to build your own high-end smart minigrid system.

The IP66 rated enclosure, keeps the battery safe from leaks and dirt. The battery can be opened for future maintenance and modifications, which gives the users the maximum range of creativity.

With more than 4000 cycle charges (80% DOD), with high energy density, intelligent features, plus protection and upgradable design, Ecobat Lithium is your best choice to build your own intelligent grid system.



EBL RANGE OVERVIEW:

Lithium Ion	EBL10	EBL20	EBL33	EBL40	EBL50	EBL75	EBL90	EBL100D	EBL100 Bluetooth	EBLU1R Bluetooth
Chemistry	Lithium-ion (LiFePO ₄)									
Nominal voltage	12.8 V	12.8 V	12.8 V	12.8 V	12.8 V	12.8 V	12.8 V	12.8 V	12.8 V	12.8 V
Nominal capacity	10Ah	20Ah	33Ah	40Ah	50Ah	75Ah	90Ah	100Ah	100Ah	48Ah
Nominal energy	128Wh	256Wh	422Wh	512Wh	640Wh	960Wh	1152Wh	1280Wh	1280Wh	614.4Wh
Internal Impedance	≤80mΩ	≤30mΩ	≤100mΩ	≤20mΩ	≤20mΩ	≤15mΩ	≤10mΩ	≤10mΩ	≤5mΩ	≤20mΩ
Charge Voltage	14.4V	14.4V	14.4V	14.4V	14.4V	14.4V	14.4V	14.4V	14.4V	14.4V
Discharge Cut-off Voltage	11.2V	11.2V	11.2V	11.2V	11.2V	11.2V	11.2V	11.2V	10V	10V
Standard Charge Current	2A	4A	6.6A	8A	10A	15A	18A	20A	20A	9.6A
Max. Charge Current	10A	20A	33A	40A	50A	75A	90A	100A	100A	25A
Standard Discharge Current	2A	4A	6.6A	8A	10A	15A	18A	20A	20A	9.6A
Max. Discharge Current	10A	20A	36A	40A	50A	75A	90A	100A	150A	25A
Peak Discharge Current	20A<5S	40A<5S	66A<5S	80A<5S	100A<5S	150A<5S	300A<5S	300A<5S	350A <5S	80A<2S
Bluetooth	No	No	No	No	No	No	No	No	Yes	Yes
Operating Temperature	Charge 0°C ~ +45°C									
	Discharge -20°C ~ +55°C									
Maximum batteries in series	4	4	4	4	4	4	4	4	4	4
Maximum batteries in parallel	2	2	2	2	2	2	2	2	4	4*
Dimensions (L x W x H) mm	151 x 100 x 104	181 x 77 x 170	196 x 132 x 165	196 x 166 x 169	229 x 138 x 208	260 x 168 x 212	307 x 172 x 212	355 x 175 x 190	330 x 175 x 195	195 x 132 x 183
Weight (Kg)	1.5kg	3.1kg	5.0kg	5.5kg	6.0kg	10.5kg	12.5kg	12.5kg	12kg	5.5kg

* Can support up to 4 parallels, however only increases amp hours not current

EBL RANGE

12V LITHIUM-ION BATTERY

LiFePO4 Deep Cycle Battery. Drop in replacement for Lead-Acid batteries for a wide range of applications.

- 100% Usable Energy: 100% Depth of Discharge, Fully Utilize Each Charges.
- Wide-Range Certificated: UL, UN38.3, CE, MSDS, etc.
- Safety First: LiFePO4 Technology Armed with BMS.
- Drop-In Replacement: Simple and Powerful, Connect and Go.
- Rival Weight: Nearly Half of the Weight of the Lead-Acid Equivalent.
- 10 Years Run Time: 4000 Cycle Life Equivalent To 10-15 Years Service Life.



ECOBAT CONNECT APP

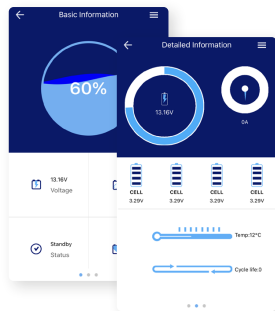
Ecobat Battery Connect Bluetooth App for ECOBAT EBL100 & EBL-U1R Lithium battery, to show the real-time status of the battery.



The Ecobat Battery monitoring app allows the user to connect with their EBL100 / EBL-U1R Lithium Ion Battery via Bluetooth. In the App, you can check the real-time Battery Information including State of Charge, Voltage Level, and Battery Temperature, as well as providing individual Cell Voltages and Alerts for Battery Status.

Features:

- You can rename your battery individually in the app.
- You can check the real-time SOC (State of Charge) of the battery.
- You can check the real-time voltage of the battery.
- You can see the internal temperature of the battery in real-time.
- You can see the battery alerts on the alerts pages if any abnormalities arise.



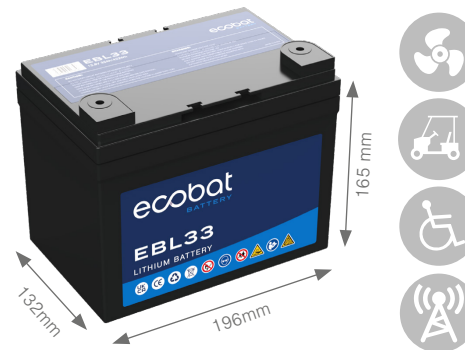
Applications

- Mobility
- Golf carts
- E Bikes
- Communications



Applications

- Mobility
- Golf carts
- Communications



Applications

- Electric outboards
- Golf carts
- Mobility Scooters
- Communications



Applications

- Electric outboards
- Mobility Scooters
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Applications

- Scrubbers
- Sweepers
- Electric Boats
- Mobility
- Leisure
- Communications



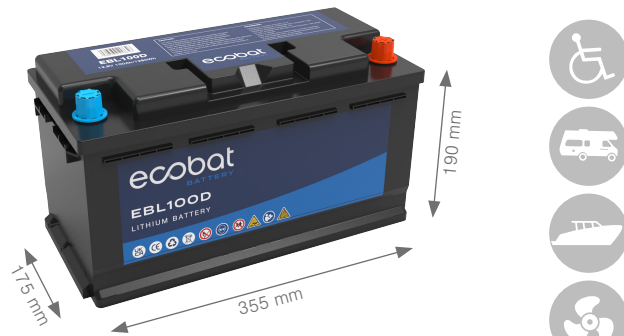
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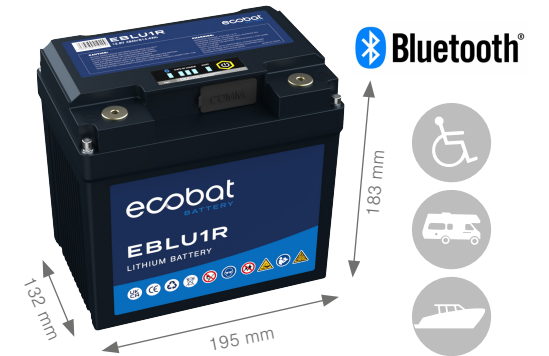
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Applications

- Mobility
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- Communications



PYLONTECH



Pylontech 12V Series All Purpose Lithium Ion Battery

INTELLIGENT BATTERY MANAGEMENT SYSTEM



Temperature
Protection



Over-Voltage
Protection



Over-Current
Protection



Heating
Film



Parallel & Serial
Balancing Strategy



Short-circuit
Protection



KEY FEATURES

Ultra-Safety

The battery management system (BMS) provides comprehensive protection to the battery and manages the charging/discharging process wisely.

Auto-Balance

Connects multiple batteries in parallel safely without internal state non-uniformity issues.

Uncompromising Quality

State-of-the-art battery cells ensure a lifespan of more than 6000 cycles, 100A continuous discharge current, and a wide range of operation temperature.

Communication

CAN, RS485, Blue Tooth, Dry Contact enable data transmission to meet the needs of different usage scenarios.

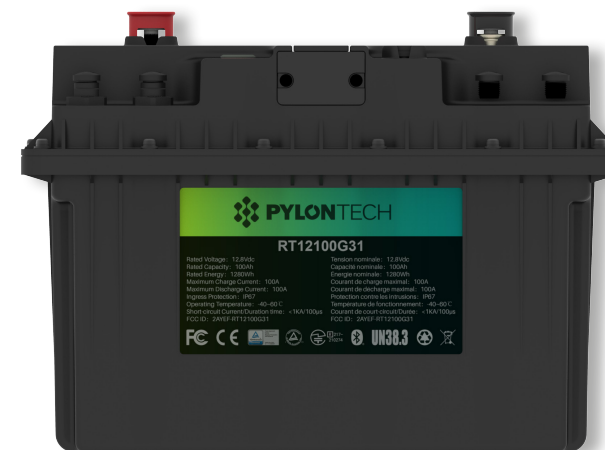
SPECIFICATION (12V)

Model	RT12100G31
Electrical	
Nominal Voltage(V)	12.8
Nominal Capacity(Ah)	100
Working Voltage Range(VDC)	10.8~14.4
Internal Resistance(mΩ)	<20
Charge Voltage(VDC)	14V-14.4
Nominal Operation Current(A)	50
Max. continuous operation current(A)	100
Peak Current(A)	200@30sec
Single String Quantity (pcs)	≤16 pcs
(Serial connection voltage / pcs 51.2Vdc / 4pcs)	
Structure	
Dimension (mm)	325 x 173.5 x 226
Weight(Kg)	13±0.2
IP rating	IP67
Terminal	M8 bolt
Working Environment	
Charge working temperature (°C)	0~60
Discharge working temperature (°C)	-20~60
Working temperature (°C)	-40~60*
Altitude (M)	<4,000
Humidity(RH)	5~95%(w/o condensing)
Communication	
RS485	115200bps
CAN	500Kbps
Bluetooth	BLE5.0
Dry contactor	2×inputs & 2×outputs
Certification	
SAE J930, SAE J1455, UL1973, IEC62619,FCC,CE, Bluetooth SIG, UN38.3	

*During -40 °C ~ -20°C only heater will be enabled for heating up the module, battery cannot charge/discharge during such period.



PYLONTECH





Choosing the
right charger
for your
battery

CTEK BATTERY CHARGERS

CTEK | MAXIMIZING
BATTERY
PERFORMANCE

CTEK design and develop a unique series of battery chargers for Lithium batteries for both private and professional use. They analyse, fix, charge and maintain many types of Lithium batteries.

CTEK offers the market high-quality, reliable chargers and accessories that are effective, user friendly and, most importantly, safe (for the user, the vehicle electronics, the battery and the charger).

Lithium XS

The LITHIUM XS is an advanced microprocessor controlled charger specially designed to charge and maintain the cells of Lithium-Ion Phosphate (LiFePO4) batteries – maximising their performance and lifespan.



Voltage	13.8/14.4 V
Charging current	Max 5 A
Charger type	8 step, fully automatic charging cycle
Battery type	12 V Lithium Ion Phosphate (LiFePO4)
Battery capacity	5–60 Ah, maintenance charging up to 120Ah
Insulation	IP65 (splash and dust proof)

D250SE

The dual input D250SE allows you to enjoy your vehicle more with maximized battery capacity as the ideal charger for vehicles without access to a mains power supply



Voltage	12 V
Charging current	Up to 20A
Charger type	5 Step Charging
Battery type	Lead acid; Lithium-ion
Battery capacity	40–300 Ah
Insulation	IP65 (splash and dust proof)

M25

The M25 is recommended for boat owners who need quick and effective charging for larger service batteries.



Voltage	12 V
Output	14.4/14.7/13.8/15.8 V, 25 A
Charger type	AC Charging
Battery type	Lead acid; Lithium-ion
Battery capacity	30–450 Ah
Insulation	IP44

PRO25S

The PRO25S is an innovative, versatile and highly efficient 25A battery charger and power supply, designed around the needs of the automotive professional.



Voltage	12 V
Output	13.8 V/14.4 V/13.3 V, 25 A, LiFePO4.
Charger type	AC Charging
Battery type	WET; MF; Ca/Ca; AGM; EFB; GEL; LiFePO4
Battery capacity	30–450 Ah
Insulation	IP44

PRO60

The CTEK PRO60 is an innovative and highly efficient 60A battery charger and power supply that's designed to meet the demands of the modern workshop



Voltage	12 V
Output	12 V, 60 A
Charger type	AC Charging
Battery type	Lead acid; Lithium-ion
Battery capacity	15–600 Ah
Insulation	IP40

VICTRON CHARGERS



BLUE SMART CHARGERS IP22

The Blue Smart IP22 Charger is the new professional battery charger with built-in Bluetooth. The Blue Smart IP22 Charger can be used on devices in your workshop and on motor vehicles, such as (classic) cars; motorbikes; boats and camper-vans. Li-ion batteries are charged with a simple bulk – absorption – float algorithm.

Fully discharged battery recovery function - Will initiate charging even if the battery has been discharged to zero volts. Will reconnect to a fully discharged Li-ion battery with internal disconnect function.



Blue Power Charger IP22	12V, 1 output 15 / 20 / 30 A	12V, 3 outputs 15 / 20 / 30 A
Input voltage range	180 – 265 VAC	
Charge current, normal mode	15 / 20 / 30 A	
Number of outputs	1	3
Charge voltage 'absorption'	Normal: 14.4 V High: 14.7 V Li-ion: 14,2 V	
Charge voltage 'float'	Normal: 13.8 V High: 13.8 V Li-ion: 13,35 V	
Charge voltage 'storage'	Normal: 13.2 V High: 13.8 V Li-ion: n. a.	
Charge algorithm	6-stage adaptive	
Protection category	IP22	

PHOENIX SMART IP43 CHARGER

With boat owners in mind this adaptive 5-step charger can provide either 30A or 50A of charge to each of three battery banks. Bluetooth enabled, you can monitor the charger and set alarms straight from your phone.

Charger on-off control can be implemented by connecting a relay or open collector optocoupler output from a Li-ion BMS to the remote on-off port.

Alternatively full control of voltage and current can be achieved with Bluetooth.



Phoenix Charger IP43	12/30 (1+1) & (3)	12/50 (1+1) & (3)
Input voltage range	230 VAC (range: 210 – 250 V)	
DC input voltage range	290 – 355 VDC	
Fully programmable	Yes, with Bluetooth and/or VE.Direct	
Charge voltage 'absorption'	Normal: 14.4V	High: 14.7V Li-ion: 14.2V
Charge voltage 'float'	Normal: 13.8V	High: 13.8V Li-ion: 13.5V
Storage mode	Normal: 13.2V	High: 13.2V Li-ion: 13.5V
Charge algorithm	5-stage adaptive	
Protection category	IP43	

BLUE SMART CHARGERS IP65

The Blue Smart IP65 Charger uses a specific charging algorithm for Li-ion (LiFePO₄) batteries, with automatic Li-ion under voltage protection reset. The Blue Smart IP65 Charger can be used on devices in your workshop and on motor vehicles, such as (classic) cars; motorbikes; boats and camper-vans.

The Blue Smart IP65 is equipped with built-in Bluetooth, so the status of the charger and the battery can be checked on a smartphone, tablet or laptop. All settings of the charger can be configured with the VictronConnect app.



Blue Power Charger IP65	12 V 15/25 A
Input voltage range	180 – 265 VAC
Charge current, normal mode	15 / 25 A
Standby power consumption	0.5 W
Charge voltage 'absorption'	Normal: 14.4 V High: 14.7 V Li-ion: 14,2 V
Charge voltage 'float'	Normal: 13.8 V High: 13.8 V Li-ion: 13,35 V
Charge voltage 'storage'	Normal: 13.2 V High: 13.8 V Li-ion: n. a.
Connectivity	Bluetooth
Protection category	IP65

ECOBAT LITHIUM SERVICES

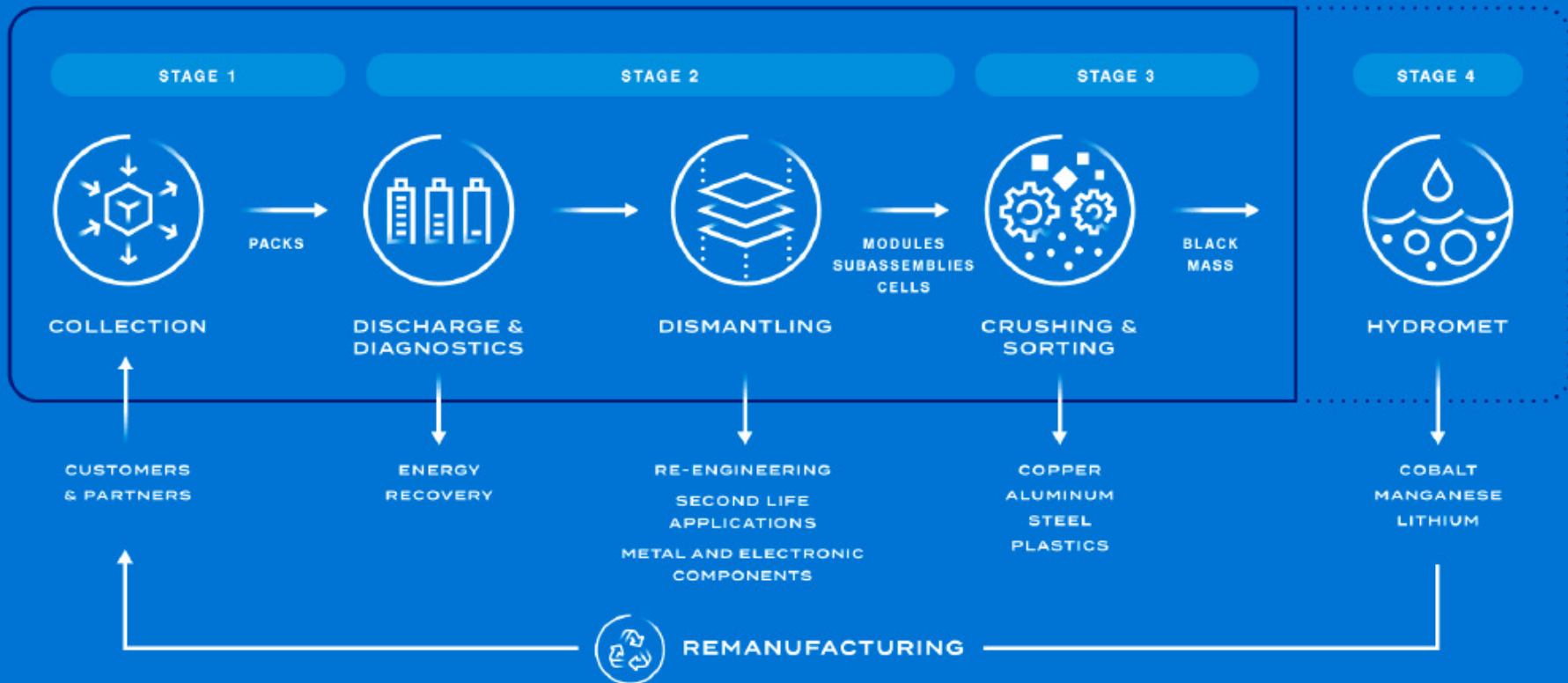
Driving lithium-ion and battery technologies into the future.

In supporting future energy and material lifecycle needs for emerging battery systems, Ecobat Solutions has been highly active in the development of advanced technologies and processes for recycling and resource recovery for Lithium-ion and other battery chemistries. We are the only European provider of fully integrated Stage 1-3 lithium battery recycling services and management services for Stage 4.



Onsite Services

Managed Services



HANDLING LITHIUM

Shipping and Health & Safety

Storage

Keep lithium batteries stored in the original packaging they were supplied in. Store them in a cool, dry environment and out of direct sunlight and away from heat sources. Store lithium batteries safely in their own area, and securely so that they cannot fall or be dropped. Do not mix new and used batteries.

Transport

Lithium batteries when transported by road, must follow the relevant legislation: – the Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR). For lithium batteries of a size where ADR regulations apply, Ecobat supply the batteries in UN approved packaging. Lithium batteries can be safely transported by customers vehicles when retained in the original UN approved packaging, providing specific lithium training has been given and documentation is completed in accordance with ADR guidance.

Charging

Our lithium batteries are supplied with a charge of 30-50%. The battery should be fully charged before supply to your customer. A lithium specific charger should be used such as the CTEK lithium XS 5amp. Automotive chargers that include a pulse phase in the charging algorithm should be avoided as this could damage the battery.

Fire prevention

Lithium batteries should be stored separately from any other flammable stocks or goods, thus ensuring that in the event of a fire, no flash-over or increased fire loss can occur.

Extinguishments:

- Dry powder extinguishers
- Carbon dioxide extinguishers
- Fire blanket systems

Waste batteries

Due to environmental threat and fire risk, lithium batteries should be recycled carefully. At Ecobat we can arrange collection of your waste lithium battery in partnership with Ecobat Logistics.

Do not place damaged batteries in regular rubbish or recycling containers.

Damaged, defective, broken and recalled Li-ion batteries must be properly packaged and shipped so that they will not create safety problems during transportation.

Complete Material Safety Data Sheets (MSDS) for all Ecobat products are available upon request. Stockists and re-sellers of lithium batteries should consult with the appropriate legislation to ensure full compliance.



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