CERTIFICATE

Product Certificate
K-0210560/03

Issued *2024-07-05*

Replaces *K-0210560/02*

Specific Certification Program 05 for Fire Protection of Lithium-ion batteries storage

STATEMENT BY KIWA
With this product certificate, issued in accordance with the Kiwa Regulations for Certification, Kiwa declares that legitimate confidence exists that the products supplied by

Lithium Safety Containers B.V.

as specified in this product certificate and marked with the Kiwa®-mark in the manner as indicated in this product certificate may, on delivery, be relied upon to comply with the international Kiwa TIC - scheme **BRL-K21045** "Fire protection Systems" dated 30-03-2021.
inclusive Specific Certification Program 05 for Fire Protection of Lithium-ion batteries storage dated[22-09-2022.

Ron Scheepers
Kiwa

Publication of this certificate is allowed.
Advice: consult www.kiwa.nl in order to ensure that this certificate is still valid.

2841190610

Kiwa Nederland B.V.
Sir Winston Churchilllaan 273
Postbus 70
2280 AB RIJSWIJK
The Netherlands
Tel. +31 88 998 44 00
info@kiwa.com
www.kiwa.nl
Office Zaltbommel
Dwarsweg 10
5301 KT Zaltbommel
The Netherlands
Tel. +31 88 9985100

Company
Lithium Safety Containers
Zilverenberg 56
5234 GM 's-HERTOGENBOSCH
Netherlands
info@lithiumsafetycontainers.nl
Tel. +31-085 060 4001
www.lithiumsafetycontainers.nl

Factory
Lithium Safety Containers
Zilverenberg 56
5234 GM 's-HERTOGENBOSCH
Netherlands

Certification process consists of initial and regular assessment of:
- **quality system**
- **product**

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PRODUCT SPECIFICATION WITH LIMITED SCOPE
The International Kiwa Testing, Inspection and Certification Scheme K21045/02 for “Fire Protection Systems” dated [30-03-2021] and Specific Certification Program 05 for Fire Protection of Lithium-ion batteries storage dated [22-09-2022].

This scheme and program have several scopes fire protection systems.
Is in application of this Specific Certification Program has the scope – E - been applied for Aerosol systems.

Field of application / scope for this specific certification program
The performance of the fire protection system is determined for a typical lithium-ion batterie(s) fire(s). The performance of the fire protection system depends heavily on the typical situation. This certification program requires an test protocol per typical situation motivated on the safety chain consists of five phases, namely pro-action, prevention, preparation, repression and aftercare of the process end-to-end.
The situational performance of the fire protection system shall be declared based on:
- The type of batteries with the maximum level of electrical energy and the typical containment / casing;
- How high the batteries are / can be electrically loaded;
- How the batteries are stored / moved / used.

The type of mitigation performance (ToMP) of the fire protection system shall be declared based on the type of protection such as:
- Fire Control;
- Fire Prevention;
- Fire Repression;
- Fire Suppression.

The effective mitigation performance time (EMPT) of the fire protection system shall be declared based on the time of the of protection is effective. For example are these hold time for total flooding systems or the time fire protection media is supplied by surface protection systems.
Based on the results of this test program in this specific certification program is additional listing possible.

Application and use
It is important that the fire protection of a building or plant be considered as a whole. Fire protection systems form only a part, though an important part, of the available facilities, but it should not be assumed that their adoption necessarily removes the need to consider supplementary measures, such as the provision of portable fire extinguishers or other mobile appliances for first aid or emergency use, or to deal with special hazards.

Advice on these matters can be obtained from the approved supplier of this manufacturer of the fire protection system according to scheme K21045. Information may also be sought from the appropriate fire authority, the health and safety authorities and insurers. In addition, reference should be made as necessary to other national standards and statutory regulations of the particular country.

It is essential that firefighting equipment be carefully maintained to ensure instant readiness when required. Routine maintenance is liable to be overlooked or given insufficient attention by the owner of the system. It is, however, neglected at peril to the lives of occupants of the premises and at the risk of crippling financial loss. The importance of maintenance cannot be too highly emphasized. Installation and maintenance should only be carried out by qualified personnel according to scheme K21045.

Inspection should include an evaluation that the fire protection system continues to provide adequate protection for the risk (protected zones as well as state of the art can change over time).

Where fire protection systems are used in a potentially explosive application, the suitability of the generator to the atmosphere for the determined life shall be assessed.

Conditions for application
The detail engineering and installation of the extinguishing system shall to be determined in conformity with the guidelines and calculation methods of the manufacturer.
The user of the extinguishing system is instructed by an instructor for this system authorized by the supplier on behalf of the manufacturer.
The detail engineering, installation and maintenance of the fire extinguishing components have to take place according to the specifications of the manufacturer and certification scheme K21045.

Point of interest during use
The fire protection systems and components should not be used on fires involving the following unless relevant testing by approved testing laboratories has been carried out to the satisfaction of the Authority.

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Design, Installation and Operation Manual

At delivery the product should be accompanied by an operation manual in the English language, known and authorized by Kiwa.
Following minimum items shall be described:

- Type of media and the fire protection generators;
- Design application density in relation to Fire Class according to EN2;
- Description of occupancies and hazards to be protected against;
- Specification of the fire protection generators;
- Equipment schedule or list of materials for each piece of equipment or device, showing device name; supplier, model or part number and description;
- System calculation;
- Enclosure pressurization and venting calculations;
- Description of fire detection, actuation and control systems.
- Requirements for inspection, maintenance and testing of an fire protection system and for the training of inspection and maintenance personnel.

For specific details regarding the owner's manual, see scheme K21045 and the Specific Certification Program 05.

Marking

The products should be marked with the Kiwa®-mark.

Place of the mark:

- On Fire Protection System

Required specifications:

- Name of the product and supplier
- Supplier's type designation
- Production date and serial number
- Fire protection media and generators
- Temperature range
- Storage humidity range
- Service life
- Safety distances as specified in certification
- Reference to the application instructions
- Certification mark
- Specific certification Program 05

Method of marking

- Non-erasable and non-detachable;
- Non-flammable;
- Permanent an legible

RECOMMENDATIONS FOR CUSTOMERS

Check at the time of delivery whether:

- the supplier has delivered in accordance with the agreement;
- the mark and the marking method are correct;
- the products show no visible defects as a result of transport etc.

If you should reject a product on the basis of the above, please contact:

- Lithium Safety Containers B.V.

and, if necessary,

- Kiwa Nederland B.V.

Consult the supplier's processing guidelines for the proper storage and transport methods.

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Product specifications / configuration

S	Situational	Information
1	Type of batterie(s)	Lithium-ion Battery Pack 48V 160AH Voltage: 48 KG: 36,00 Charged loading: 97% - 100% Type: LiFePo4 Shandong Goldencell Electronics Technology Co.,Ltd 160Ah - 7.680Wh 465*245*155 mm Metal casing And Lithium-ion batteries : Lithium-ion Rechargeable Battery(UN3480) JY 36V21Ah Voltage: 36 KG: 15,00 Charged loading: 100% Type: JY 36V21Ah Clouds Power Tech Co., Ltd 31Ah - 1.116Wh 307*167*285 mm Plastic casing
2	Maximum level of electrical energy of the batteries	100 AH – 48V.
3	Casing material of the batteries	Metal
4	Containment of the batteries in a compartment.	A closed compartment is essential for an effective fire protection and to be strong enough to resist the peak pressure from the burning batteries. An effective pressure relief of the compartment is essential.
4a	The maximum compartment volume and height.	10ft 2,8 x 2,35 m & high 2,4 m. 20ft 5,9 x 2,35 m & high 2,4 m. 40ft 12 x 2,35 m & high 2,4 m.
4b	The physical characteristic of the compartment with a view on the escalation process.	Reinforced concrete minimal 10 cm thick or waved steel minimal 2 mm thick according to ISO. Container inside is fully lined with 2x double Fermacell 150 W60 or 1x Magoxx@board 15mm groove connection fire resistance W90
4c	Resistance to fire penetration and/or fire spread compartment. This with a view on the escalation process. EN13501-2 classifications.	90 Minutes. Based on Reinforced concrete minimal 10 cm thick or waved steel minimal 2 mm thick according to ISO. Container inside is fully lined with 2x double Fermacell 150 W60 or 1x Magoxx@board 15mm groove connection fire resistance W90
4d	The packages of the batteries	-Non -The distance between the batteries must be at least 15 centimeters.
4e	The storage arrangements of the batteries in maximum height and distance. This with a view on the escalation process.	Defined in the designed drawings approved by Kiwa.
4f	The batteries are stored / charging / repaired in the compartment.	Storage Charging Repairing
ToMP	**Type of Mitigation Performance**	
	a. Fire Control b. Fire Prevention c. Fire Repression d. Fire Suppression This with a view on the escalation process.	a. Fire control d. Fire Suppression
EMPT	**Effective Mitigation Performance Time**	
	a. Hold time total flooding systems required based of the fire protection media or; b. Supply time fire protection media for surface protection. This with a view on the escalation process.	a. 90 minutes. b. Not applicable.
FPM	**Fire Protection Media**	
	Speciation, classification and initial approval and certification of the FPM.	AF-X Fireblocker Aerosol is Kiwa certified BRL K23001 - Product Certification Scheme for non-pressurized

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		condensed aerosol generators and components used in fixed fire extinguishing systems Product certificate Kiwa BRL K23001 : K101072 10ft Container; 1 X BM grams **≥103,10 gr/m3** incl. Safety factor. 20ft Container; 1 x BL3900 and 1x CM450 grams **≥103,10 gr/m3** incl. Safety factor. 40ft Container; 2 x BL3900 **≥103,10 gr/m3** incl. Safety factor.
FPS	**Fire Protection System**	
	Configuration of the FPS This with a view on the escalation process.	FPS according to scheme K23003 / K21045 - E – aerosol.
FDS	**Fire Detection System**	
	Configuration of the FDS based on 2 depend detector independence with a minimal of 2 fire phenomena. This with a view on the escalation process.	FDS according to scheme K23003 / / K21045 - E – aerosol.
IM	**Initiation Method** of a cell in the batteries	
	a. Electrical overload creating shortcut between cathode and anode of the cell in the batteries. b. External heating (element) damaging the isolation creating shortcut between cathode and anode of the cell in the batteries. c. Blunt external mechanical force (axe) damaging the isolation creating shortcut between cathode and anode of the cell in the batteries. d. Other method applicable for the typical situation.	External electrical heating plug. And Blunt external mechanical force (axe) damaging the isolation creating shortcut between cathode and anode of the cell in the batteries.
C	**Closing of the compartment after activation**	
	Procedure of closing the compartment. Focal points in this procedure are: a. having sufficient oxygen in the compartment when the batteries are activated; b. the function and performance of the fire protection system (for example self-closing); c. the follow mitigation process.	The door shall be normally closed. When the compartment is opened for stockage the staff shall be trained in closing the door immediately for an effective fire protection.
FMP	**Follow-up Mitigation Process**	
	The method used after the test used to finally mitigate the risk of fire of the batterie(s).	Trained fire repression staff shall be needed to extract the temporally controlled burning batteries and to stabilize them.

Table 1 – configuration setup based on Kiwa report PA0115030 and A0115031, 22 and 23 November 2022.