CERTIFICATE

Product Certificate
K-0211187/01

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Replaces	*n/a*
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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

Mobile Locker N.V. – S4FE.

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.

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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.

Design, Installation and Operation Manual

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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:

- Mobile Locker N.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)	Specification(s) LiPo pack 2x 6 cells 22.2v 488.4Wh Brand Tatu and LiPo pack 1x 6 cells 22.2v 66.6 Wh Brand: Gens ACQ Total of 1043.4 Wh Installation Type 1: Initially a FP200 generator (118 grams effective output) activated by the and after 12 minutes a FP100 (61 grams effective output). Both aerosol generators of manufacturer FirePro Systems LTD with a product certificate according certification scheme K23001. Installation Type 2 : Initially a FP200 generator (118 grams effective output activated. The aerosol generator of manufacturer FirePro Systems LTD with a product certificate according certification scheme K23001.
2	Maximum level of electrical energy of the batteries	100% charged with in total: 1048,8Wh and 1043,4 Wh
3	Casing material of the batteries	Plastic heatschrink and aluminum plating.
4	Containment of the batteries in a compartment.	Storage cabinet for batteries for cycles. 9 individual stainless steel shelves, interconnected by ducts for airflow/ fire suppressant.
4a	The maximum compartment volume and height.	*9 individual lockers:* *0,036m^3 each* *Back duct: 0,044m^3* *Side duct: 0,011m^3*
4b	The physical characteristic of the compartment with a view on the escalation process.	Steel cabinet with several lockers. Bottom and top: 1,5 mm stainless steel shelve Sides: 2 mm powder coated steel Back: steel mesh wire diameter 3 mm. 50 mm spacing (open towards duct)
4c	Resistance to fire penetration and/or fire spread compartment. This with a view on the escalation process. EN13501-2 classifications.	30 minutes based on the solid steel compartment of the locker system with an active fire protection system to control the fire for minimal 30 minutes with a 200 and a 100 grams aerosol unit and 60 minutes with 1 aerosol unit 200 grams.
4d	The packages of the batteries for examples in pallet arrangements with for example with carton or plastic.	Separate solitaire stocking per locker. Connected by ducts.
4e	The storage arrangements of the batteries in maximum height and distance. This with a view on the escalation process.	Not applicable.
4f	The batteries are stored / loaded / repaired in the compartment.	Stored and loaded.
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.	Fire suppression following fire control.
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.	Test 4 Installation type 1: 60 minutes this based on the first activation generator of the fire protection system and 12 minutes later for the activation of the secondary additional generator. Test 5 Installation type 2: 60 minutes this based on the activation of the generator.
FPM	**Fire Protection Media**	
	Speciation, classification and initial approval and certification of the FPM.	Aerosol according to scheme K23001 from FirePro Systems LTD with product certificate number K21774.
FPS	**Fire Protection System**	
	Configuration of the FPS This with a view on the escalation process. *Configuration used during the test whit motivation for the engineering choices.*	Installation Type 1: FP200 in the vent compartment of the locker system. and an additional FP100 after 12 minutes to prolong the minimum density. Installation Type 2: FP200 in the vent compartment of the locker system. At the top of the vent compartment is an overpressure relieve installed with setting of 1070 pascal +/- 10% for fine tuning.

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		See pressure test ML (actiflow)
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. *Configuration used during the test whit motivation for the engineering choices.*	For this special application is a smoke detector planned in every separate locker compartment within the vent compartment of the locker system to have swift reaction. The smoke detector is a Conventional Photoelectric Smoke Detector type Apollo Type XP95 with approval from LPCB based on EN54-7. Based on two independent detectors for activation of the aerosol. Zone/group 1: 5 detectors Zone/group 2: 4 detectors There is no delay on the activation.
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 or nail) damaging the isolation creating shortcut between cathode and anode of the cell in the batteries. d. Other method applicable for the typical situation. *Initiation method used during the test whit motivation for the engineering choices.*	During the pre-test was method (b) used what led to abnormal high reactions and was this method discarded as functional. Method (a) was pre-tested by Mobile Locker and led also to abnormal high reactions and was this method discarded as functional. During the final tests was method (c) used with steel nail that was hammered to the pouch cell and led to a normal fire process.
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.	As this is a locker system for safe storage (especially for theft) the default state of a door is closed at all times. The Locker is opened and closed regularly by customer and is completely filled with air at all times. Specific for the test: all doors were closed only within 5min before the test, ensuring all compartments are fully filled with air. The door of the locker compartment with the activated battery pack was open at the start of the process and then closed. Air was moving freely to al the separate closed lockers through the venting system in the locker system.
FMP	**Follow-up Mitigation Process**	
	The method used after the test used to finally mitigate the risk of fire of the batterie(s).	After fire detection, The FirePro control module will activate an alarm system that can be relayed to the responsible person or fire department. The 30 or 60 min fire suppression buys a window for the Fire Services to arrive and prepare the battery extraction. All locker can be opened from an emergency release lever and the battery can be cooled (CO_2 extinguisher) and submerged in a metal container filled with water. This until the chemical reaction inside the battery stops and all energy is dispersed. (up to 4 weeks).

Table 1 – configuration setup based on Kiwa report - 23 march 2022 and

22 February 2023 Testing a repression system for boxed lithium batteries within a locker system.