Test Report

Report No. : UNIB21111817FR-01

Applicant	:	INTI Photovoltaics SL
Address	:	B88082912, Barcelona, Spain
Name of sample	:	LITHIUM ION BATTERIES
Model No.	:	ILFPOS-3072, ILFPOS-3840
Receiving Date	:	Nov. 18, 2021
Test Date	:	Nov. 18, 2021 to Nov. 30, 2021
Test Location	:	#NO.47-3 industrial road, Zhushan village, Dalong street, Panyu District, Guangzhou, China.
Test Method	:	IEC 62619:2017 Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for secondary lithium cells and batteries, for use in industrial applications
Testing Item	:	See the test data page
Decision Rule	:	See the test data page
Conclusion	:	The sample meets the standard test requirements

Shenzhen United Testing Technology Co.,Ltd

Signed for and on behalf of

Liu Ze
Approved Signatory

Dec. 17, 2021
Signatory Date

深圳市优测检测技术有限公司
Shenzhen United Testing Technology Co.,Ltd.
Inspection and Testing Special Seal

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1、Conclusion

The sample was detected and according to the detection results, the conclusion are as follows:

sample	Test method clause	test items	Determination of test results
LITHIUM ION BATTERIES	7.2.1	External short-circuit test (cell or cell block)	☒P ☐F ☐NA
	7.2.2	Impact test (cell or cell block)	☒P ☐F ☐NA
	7.2.3.2	Whole drop test (cell or cell block, and battery system)	☒P ☐F ☐NA
	7.2.3.3	Edge and corner drop test (cell or cell block, and battery system)	☒P ☐F ☐NA
	7.2.4	Thermal abuse test (cell or cell block)	☒P ☐F ☐NA
	7.2.5	Overcharge test (cell or cell block)	☒P ☐F ☐NA
	7.2.6	Forced discharge test (cell or cell block)	☒P ☐F ☐NA
	7.3.2	Internal short-circuit test (cell)	☒P ☐F ☐NA
	7.3.3	Propagation test (battery system)	☒P ☐F ☐NA
	8.2.2	Overcharge control of voltage (battery system)	☒P ☐F ☐NA
	8.2.3	Overcharge control of current (battery system)	☒P ☐F ☐NA
	8.2.4	Overheating control (battery system)	☒P ☐F ☐NA

General comments:

The test results presented in this report are only relevant to the test samples.

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Possible test conditions:	
——The test case does not apply to the test product:	NA
——The test sample meets the requirements:	P
——The test sample does not meet the requirements:	F

2、Sample information

For samples, the information provided by the customer is as follows:

The test model is ILFPOS-3072, Additional models are ILFPOS-3840; These types of batteries belong to the same electrochemical system, the same voltage, and the capacity deviation is not large. According to the CBTL system, they can be regarded as the same series of tests. The test sample is the series of maximum capacity batteries.

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
ILFPOS-3072	150 Ah; 3840 Wh	25.6 V	100 A	100 A	150 A	150 A	50 V	18 V

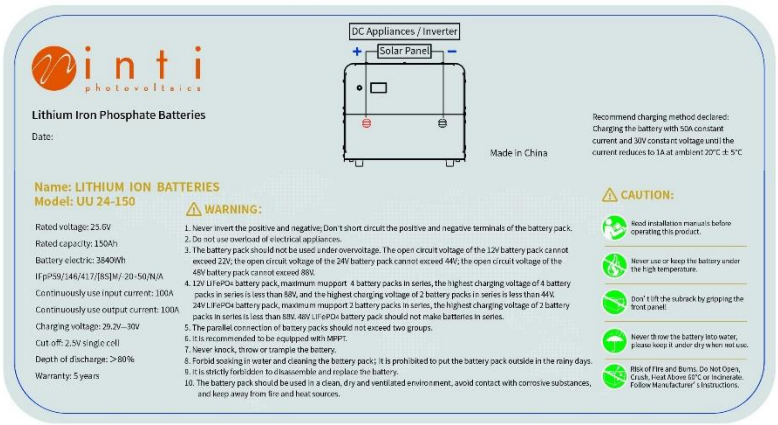
Manufacturer：INTI Photovoltaics SL

Address： B88082912, Barcelona, Spain

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Copy of marking plate:



尺寸：185×100mm；R13mm

Circuit Diagram

/

3、Detection of clause

IEC 62619:2017			
Clause	**Requirements**	**Result**	**Verdict**
4	**PARAMETER MEASUREMENT TOLERANCES**		P
	Parameter measurement tolerances		P
5	**GENERAL SAFETY CONSIDERATIONS**		
5.1	**General**		P
	Cells and batteries are safe under conditions of both intended use and reasonably foreseeable misuse.....:	See also table 5.1 for Critical components information	P
5.2	**Insulation and wiring**		P
	Voltage, current, altitude, and humidity requirements		P
	Adequate clearances and creepage distances between connectors		P
	The mechanical integrity of internal connections		P
5.3	**Venting**		P
	Pressure relief function		P
	Encapsulation used to support cells within an outer casing		P
5.4	**Temperature/voltage/current management**		P
	The design prevents abnormal temperature-rise		P
	Voltage, current, and temperature limits of the cells		P
	Specifications and charging instructions for equipment manufacturers		P
5.5	**Terminal contacts of the battery pack and/or battery system**		P
	Polarity marking(s)		P
	Capability to carry the maximum anticipated current		P
	External terminal contact surfaces		P
	Terminal contacts are arranged to minimize the risk of short circuits		P
5.6	**Assembly of cells, modules, or battery packs into battery systems**		
5.6.1	General		P
	Independent control and protection method(s)		P
	Recommendations of cell operating limits by the cell manufacturer		P

IEC 62619:2017			
Clause	**Requirements**	**Result**	**Verdict**
	Batteries designed for the selective discharge of a portion of their series connected cells		P
	Protective circuit component(s) and consideration to the end-device application		P
5.6.2	Battery system design		P
	The voltage control function		P
	The voltage control for series-connected batteries		P
5.7	**Operating region of lithium cells and battery systems for safe use**		
	The cell operating region.....:	-15°C - 60 °C	P
	Designation of battery system to comply with the cell operating region		P
5.8	**Quality plan**		
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented.....:	Reference: ISO 9001:2015	P
	The process capabilities and the process controls		P

6	**TYPE TEST CONDITIONS**		
6.1	**General**		P
6.2	**Test items**		
	Cells or batteries that are not more than six months old (See Table 1 of IEC62619)	Nov, 2021	P
	Capacity confirmation of the cells or batteries		P
	Default ambient temperature of test, 25 °C ± 5 °C		P

7	**SPECIFIC REQUIREMENTS AND TESTS**		
7.1	**Charging procedure for test purposes**		
	The battery discharged to a specified final voltage prior to charging		P
	The cells or batteries charged using the method specified by the manufacturer .....:	See the page 3.	P
7.2	**Reasonably foreseeable misuse**		
7.2.1	External short-circuit test (cell or cell block)		P
	Short circuit with total resistance of 30 mΩ ± 10 mΩ at 25 °C ± 5 °C		P
	Results: no fire, no explosion		P
7.2.2	Impact test (cell or cell block)		P

IEC 62619:2017			
Clause	**Requirements**	**Result**	**Verdict**
	Cylindrical cell, longitudinal axis impact		P
	Prismatic cell, longitudinal axis and lateral axis impact		N/A
	Results: no fire, no explosion.	No fire, no explosion.	P
7.2.3	Drop test (cell or cell block, and battery system)		P
7.2.3.1	General		P
7.2.3.2	Whole drop test (cell or cell block, and battery system)		P
	Description of the Test Unit ..... :		—
	Mass of the test unit (kg)..... :		—
	Height of drop (m) ..... :		—
	Results: no fire, no explosion	No fire, no explosion.	P
7.2.3.3	Edge and corner drop test (cell or cell block, and battery system)		P
	Description of the Test Unit ..... :		—
	Mass of the test unit (kg)..... :	60.23kg	—
	Height of drop (cm)..... :	2.5cm	—
	Results: no fire, no explosion		P
7.2.4	Thermal abuse test (cell or cell block)		P
	Results: no fire, no explosion	No fire, no explosion.	P
7.2.5	Overcharge test (cell or cell block)		P
	For those battery systems that are provided with only a single protection for the charging voltage control		—
	Results: no fire, no explosion..... :	No fire, no explosion.	P
7.2.6	Forced discharge test (cell or cell block)		P
	Upper limit charge voltage of the cell..... :		P
	Cells connected in series in the battery system..... :		P
	Redundant or single protection for discharge voltage control provided in battery system..... :		P
	Target Voltage ..... :		P
	Maximum discharge current of the cell, I_m ..... :		P
	Discharge current for forced discharge, 1.0 It..... :		P
	Discharging time, t = (1 It / I_m) x 90 (min.)..... :	90min	P
	Results: no fire, no explosion..... :	No fire, no explosion.	P
7.3	**Considerations for internal short-circuit – Design evaluation**		

IEC 62619:2017			
Clause	**Requirements**	**Result**	**Verdict**
7.3.1	General		P
7.3.2	Internal short-circuit test (cell)		P
	Samples preparation procedure: a), in accordance with 8.3.9 of IEC62133:2012; or b), the nickel particle inserted before charging, or c), the nickel particle was inserted before electrolyte filling.....:		P
	Tested according to Cl. 8.3.9 of IEC 62133:2012 test method, except all tests were carried out in an ambient temperature of 25 °C ± 5 °C.		P
	The appearance of the short-circuit location recorded by photograph or other means.....:		—
	The pressing was stopped - When a voltage drop of 50 mV was detected; or		P
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) was reached		P
	Results: no fire, no explosion.....:	No fire, no explosion.	P
7.3.3	**Propagation test (battery system)**		P
	Method to create a thermal runaway in one cell .....:		P
	Results: No external fire from the battery system or no battery case rupture.....:	No external fire from the battery	P

8	**BATTERY SYSTEM SAFETY (CONSIDERING FUNCTIONAL SAFETY)**		
8.1	**General requirements**		P
	Functional safety analysis for critical controls		P
	Conduct of a process hazard, risk assessment and mitigation of the battery system		P
8.2	**Battery management system (or battery management unit)**		
8.2.1	Requirements for the BMS		P
	The safety integrity level (SIL) target of the BMS		P
	The charge control evaluated by tests in clauses 8.2.2 to 8.2.4		P
8.2.2	Overcharge control of voltage (battery system)		P
	The exceeded charging voltage applied to the whole battery system		P
	The exceeded charging voltage applied to only a part of the battery system, such as the cell(s).....:		P

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IEC 62619:2017			
Clause	**Requirements**	**Result**	**Verdict**
	Results: no fire, no explosion..... :	No fire, no explosion.	P
	The BMS interrupted the overcharging before reaching 110% of the upper limit charging voltage		P
8.2.3	Overcharge control of current (battery system)		P
	Results: no fire, no explosion..... :	No fire, no explosion.	P
	The BMS detected the overcharging current and controlled the charging to a level below the maximum charging current		P
8.2.4	Overheating control (battery system)		P
	The cooling system, if provided, was disconnected		P
	Elevated temperature for charging, 5 °C above maximum operating temperature..... :		P
	Results: no fire, no explosion..... :	No fire, no explosion.	P
	The BMS detected the overheat temperature and terminated charging		P
	The battery system operated as designed during test		P

9	**INFORMATION FOR SAFETY**		
	The cell manufacturer provides information about current, voltage and temperature limits of their products		P
	The battery system manufacturer provides information regarding how to mitigate hazards to equipment manufacturers or end-users.		P

10	**MARKING AND DESIGNATION (REFER TO CLAUSE 5 OF IEC 62620)**		
	The marking items shown in Table 1 in IEC 62620 indicated on the cell, battery system or instruction manual.		P
	Cell or battery system has clear and durable markings		P
	Cell designation		P
	Battery designation		P
	Battery structure formulation		P

ANNEX A	**OPERATING REGION OF CELLS FOR SAFE USE**		
A.1	General		P
A.2	Charging conditions for safe use		P

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IEC 62619:2017			
Clause	**Requirements**	**Result**	**Verdict**
A.3	Consideration on charging voltage		P
A.4	Consideration on temperature		P
A.5	High temperature range		P
A.6	Low temperature range		P
A.7	Discharging conditions for safe use		P
A.8	Example of operating region		P

ANNEX B	**PROCEDURE OF 7.3.3 PROPAGATION TEST**		
B.1	General		P
B.2	Test conditions:		P
	– The battery fully charged according to the manufacturer recommended conditions .....:	See the page 3.	—
	– Target cell forced into thermal runaway.....:		—
	– A specially prepared sample (e.g. a heater or a hole for nail penetration provided) used for ease of testing .....:		—
B.3	Method used for initiating the thermal runaway. 1) Heater (Heater, Burner, Laser, Inductive heating 2) Overcharge 3) Nail penetration of the cell 4) Combination of above methods 5) Other methods.....:		—

ANNEX C	**PACKAGING**		
	The materials and pack design chosen in such a way as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants		P

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5.1	TABLE: Critical components information				
Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity [1)]
Encapsulation	--	--	--	--	--
- Enclosure	--	--	--	--	--
- Jacket	--	--	--	--	--
Insulation	--	--	--	--	--
- Insulation tape	--	--	--	--	--
- Insulation sheet	--	--	--	--	--
- Spacer/Holder	--	--	--	--	--
- Insulation paper	--	--	--	--	--
Internal wiring	--	--	--	--	--
Tubing/ Sleeving	--	--	--	--	--
Cell inter-connection Busbar	--	--	--	--	--
Internal Plastic	--	--	--	--	--
Printed Wiring Board	--	--	--	--	--
Heat-sink	--	--	--	--	--
Contactor	--	--	--	--	--
Fuse external to BMS	--	--	--	--	--
Battery management system (BMS)	--	--	--	--	--
- Control Software	--	--	--	--	--
- Thermostat	--	--	--	--	--
- Fuse	--	--	--	--	--
- PTC	--	--	--	--	--
- NTC	--	--	--	--	--
- Control IC	--	--	--	--	--
- MOSFET	--	--	--	--	--
- Current sensing resistor	--	--	--	--	--
Heater	--	--	--	--	--
Fans	--	--	--	--	--
Coolant pump	--	--	--	--	--
Coolant	--	--	--	--	--
Valve	--	--	--	--	--
Terminal contacts	--	--	--	--	--
Connector	--	--	--	--	--
Rating Label	--	--	--	--	--
Cells	--	--	--	--	--

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- Case	--	--	--	--	--
- Cell Lid	--	--	--	--	--
- Electrolyte	--	--	--	--	--
- Separator	--	--	--	--	--
- Insulation	--	--	--	--	--
- Centre tube	--	--	--	--	--
- Anode	--	--	--	--	--
- Cathode	--	--	--	--	--
- PTC	--	--	--	--	--
- CID	--	--	--	--	--
- Vent or pressure release mechanism	--	--	--	--	--

Supplementary information:

[1] Provided evidence ensures the agreed level of compliance. See OD-CB2039.

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4、Sample Photo

Details of:	Fig. 1 – Front view of Battery
	

Details of:	Fig. 2 – Back view of Battery
	

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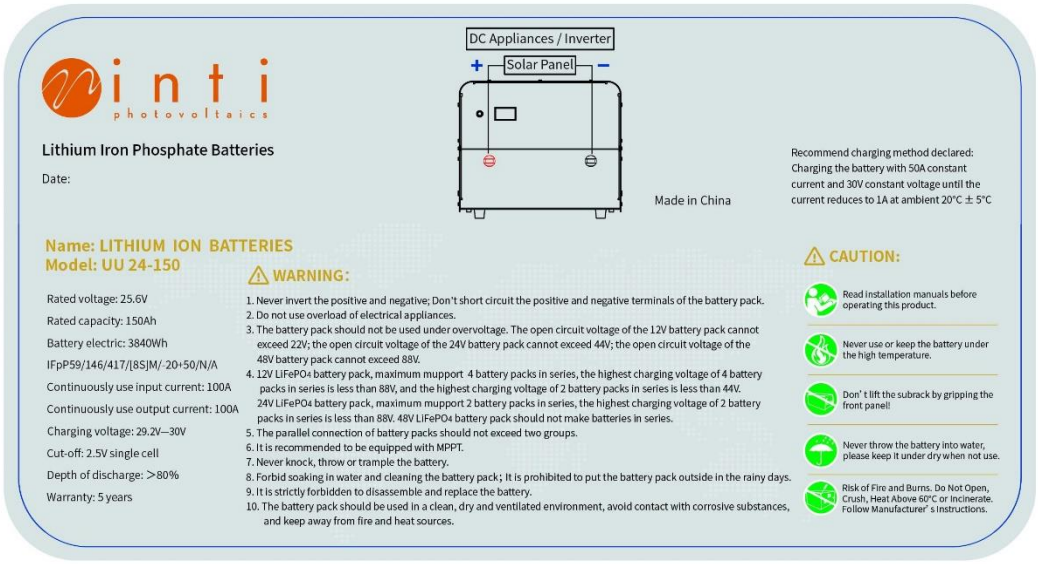
Details of:	Fig. 3 – Battery Mark



尺寸：185×100mm；R13mm

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For cases where compliance is determined based on test values, when relevant specifications, standards, documents, and customers have no relevant requirements and no other special instructions, the test report issued by this laboratory is carried out in full value and adopts ILAC-G8:09 /2019 "Simple Acceptance Rule" for judgment.

11、在中华人民共和国境内，本报告无CMA认可状态标识时，报告仅供科研、教学或内部质量控制等活动使用。

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