



TEST REPORT

UN ST/SG/AC.10/11/Rev.7+Amd.1:2021

RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS MANUAL OF TESTS AND CRITERIA, PART III, SECTION 38.3 LITHIUM METAL AND LITHIUM-ION BATTERIES

Report Number : 21PP451-02_0

Date of issue : 2022-04-11

Total number of pages : 40

Tested by : Peter Filser

(printed name and signature) :

Approved by : Nadiya Eichberg

(printed name and signature) :

Testing Laboratory : Kiwa Primara GmbH

Address : Gewerbestraße 28, 87600 Kaufbeuren; Germany

Applicant's name : SIFLY AI LTD

Address : 15-17 Tintyava str.
1113 Sofia
Bulgaria

Test specification:

Standard : UN ST/SG/AC.10/11/Rev.7+Amd.1:2021

Recommendations on the TRANSPORT OF DANGEROUS
GOODS

MANUAL OF TESTS AND CRITERIA, PART III, SECTION 38.3
LITHIUM METAL AND LITHIUM ION BATTERIES

Test procedure : Transportation test

Non-standard test method : -

Test item description : Battery pack for electric hydrofoil

Trademark : SiFly

Manufacturer : SIFLY AI LTD

Model/Type reference : SiFly PowerCell LR

Date of receipt : 2021-12-07

Result : All performed tests were successfully passed

Remarks : The test results presented in this report relate only to the object
tested and for the sample as received

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HISTORY SHEET:			
DATE	PROJECT ENGINEER	WHAT WAS CHANGED WHAT WAS REQUIRED TO IMPLANT THE CHANGE (LIKE RETEST)	REPORT NUMBER WITH REVISION
2022-04-11	PETER FILSER	INITIAL REPORT WRITTEN	0

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1. Test Documentation

Customer:

Applied standard(s):

Performed tests:

Executing test laboratory:

Specimens received on:

Total test duration:

SIFLY AI LTD

UN ST/SG/AC.10/11/ Rev.7+Amd.1:2021

Recommendations on the

TRANSPORT OF DANGEROUS GOODS

Manual of Tests and Criteria, part III, section
38.3

Lithium metal and lithium-ion batteries

Conditioning

T.1 Altitude simulation

T.2 Thermal test

T.3 Vibration

T.4 Shock

T.5 External short circuit

T.7 Overcharge

Kiwa Primara GmbH

Gewerbestraße 28, 87600 Kaufbeuren; Germany

2021-12-07

2021-12-07 – 2022-03-02

2. Description of specimens

2.1 Technical data

Designation of specimens:	SiFly PowerCell LR
Manufacturer:	SIFLY AI LTD
Configuration and cell type:	14P14 INR18650
Nominal capacity:	44,8 Ah
Nominal voltage:	52 V
Discharge end voltage:	42,7 V
Dimensions:	300x390x80 mm
Weight:	12500g
Software status (if committed):	-
Hardware status (if committed):	Sifly PowerCell LR Li-Ion 14S14P

2.2 Pictures of delivery state

Figure 1: Delivery state – front view



Figure 2: Delivery state – top view



Figure 3: Delivery state – bottom view

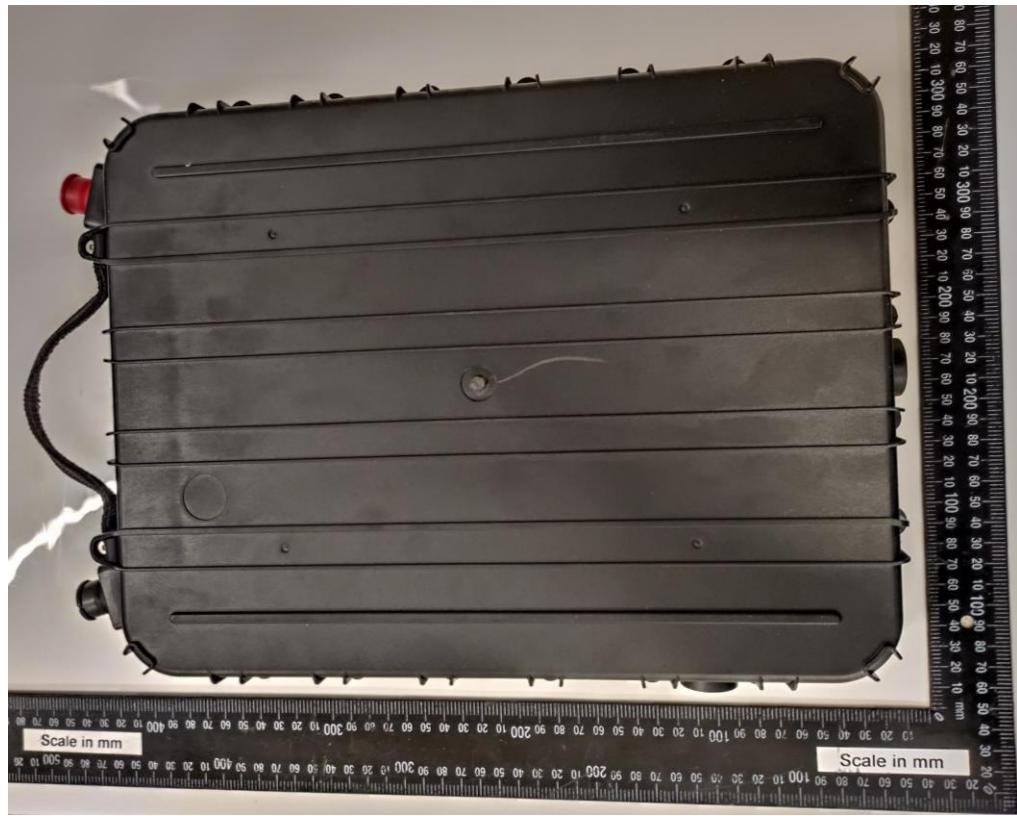
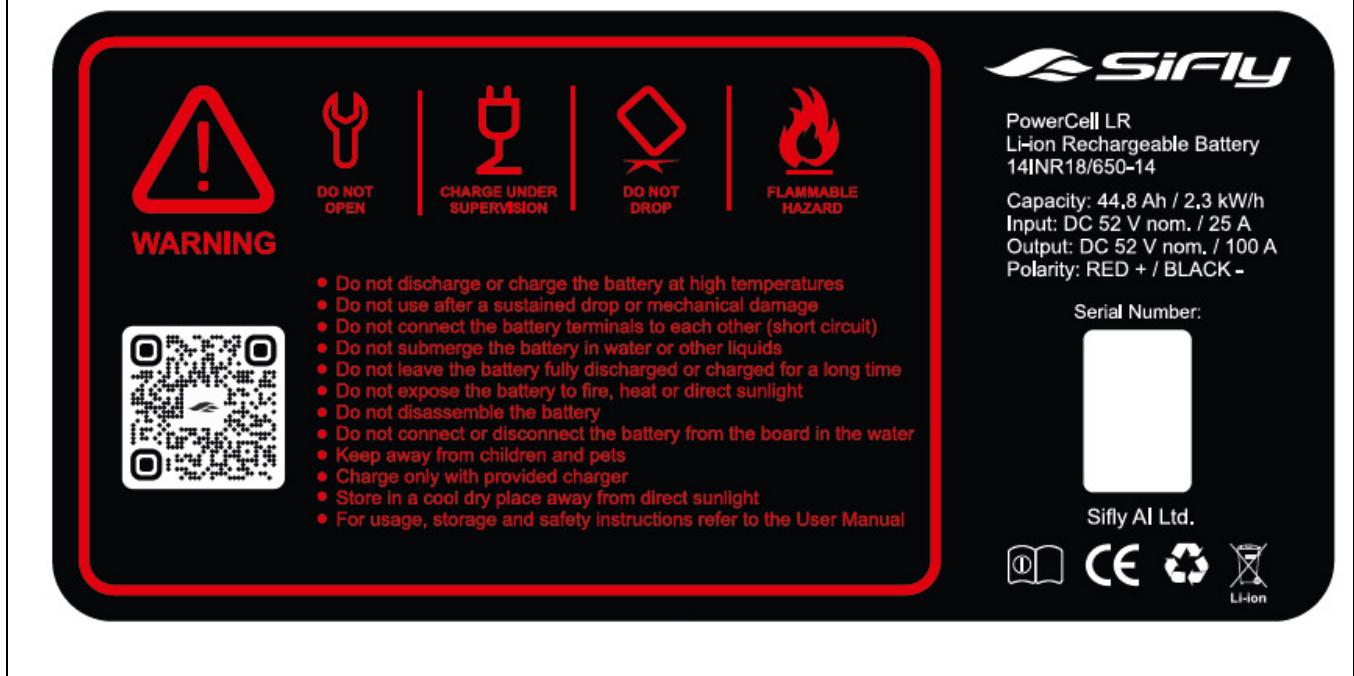


Figure 4: Delivery state – side view



Figure 5: Marking plate



3. Testing

3.1 Specifications

UN Manual of Tests and Criteria, Part III; Section 38.3, Lithium metal and lithium-ion batteries (UN ST/SG/AC.10/11/Rev.7+Amd.1:2021)

All rechargeable battery types, including those composed of previously tested cells, shall be subjected to tests T.1 to T.5 and T.7.

Tests T.1 to T.5 shall be conducted in sequence on the same battery. Test T.7 may be conducted using undamaged batteries previously used in tests T.1 to T.5 for purposes of testing on cycled batteries.

As the weight of the battery type is more than 12 kg, it is considered as a big battery.

When testing rechargeable batteries under tests T.1 to T.5 and T.7, two big batteries at first cycle, in fully charged states, and two big batteries after 25 cycles ending in fully charged states shall be tested.

3.2 Test matrix

The following test matrix provides an overview which specimen was part of which partial test.

Partial test	Specimen no.							
	A	B	C	D	E	F	G	H
T.1 Altitude simulation	X	X	X	X	-	-	-	-
T.2 Thermal test	X	X	X	X	-	-	-	-
T.3 Vibration (altered test values)	X	X	X	X	-	-	-	-
T.4 Shock	X	X	X	X	-	-	-	-
T.5 External short circuit	X	X	X	X	-	-	-	-
T.6 Impact	-	-	-	-	-	-	-	-
T.7 Overcharge	-	-	-	-	X	X	X	X
T.8 Forced Discharge	-	-	-	-	-	-	-	-

Legend:

X - part of partial test, result passed X - part of partial test, result failed

O - part of partial test, result has to be evaluated by the customer 3.3 Conditioning

Methods of measurement according to:						
UN Manual of Tests and Criteria, Part III, Section 38.3, Lithium metal and lithium-ion batteries (UN ST/SG/AC.10/11/Rev.7+Amd.1:2021)						
Purpose of test:						
When a cell or battery type is to be tested under the following sub-sections, the cell or battery has to be conditioned.						
Test procedure:						
Sample no.	Number of cycles	State of charge after conditioning	Used test equipment			
A, B, E, F	1	Charged	Inv. No: 1007			
			Inv. No: 1009			
C, D, G, H	25	Charged	Inv. No: 1007			
			Inv. No: 1009			
Temperature		21,6°C				
Used test equipment:						
Ambient Logger						
Type:	Saveris 2 (H1)	Ser. No:	54636198			
Manufacturer:	Testo Se & Co. KGaA	Inv. No:	755			
Last calibration:	2021-05-03					
Regenerative Power Systems:						
Type:	IT-M3632	Ser. No:	803126073767080006			
Manufacturer:	ITECH ELECTRONIC CO., LTD.	Inv. No:	1007			
Last calibration:	N/A					
Type:	IT-M3632	Ser. No:	803126073767080002			
Manufacturer:	ITECH ELECTRONIC CO., LTD.	Inv. No:	1008			
Last calibration:	N/A					
Type:	IT-M3632	Ser. No:	803126073767080004			



Manufacturer:	ITECH ELECTRONIC CO., LTD.	Inv. No:	1009
Last calibration:	N/A		
Type:	IT-M3632	Ser. No:	803126073767080001
Manufacturer:	ITECH ELECTRONIC CO., LTD.	Inv. No:	1010
Last calibration:	N/A		
<hr/>			
Digital Multimeter			
Type:	175	Ser. No:	51280453
Manufacturer:	Fluke	Inv. No:	966
Last calibration:	2021-06-02		
<hr/>			
Clampmeter			
Type:	365	Ser. No:	39100076WS
Manufacturer:	Fluke	Inv. No:	642
Last calibration:	2021-12-08		
<hr/>			
Balance			
Type:	DE15K5N	Ser. No:	WD080060800
Manufacturer:	Kern&Sohn	Inv. No:	548
Last calibration:	2021-03-12		
<hr/>			
Test result:			
Test requirements	<input type="checkbox"/> pass	<input type="checkbox"/> fail	<input checked="" type="checkbox"/> applied
Comment(s): Cycling conducted by the customer			
Testing conducted:			
Person in charge:	Peter Filser	Date:	2021-12-07

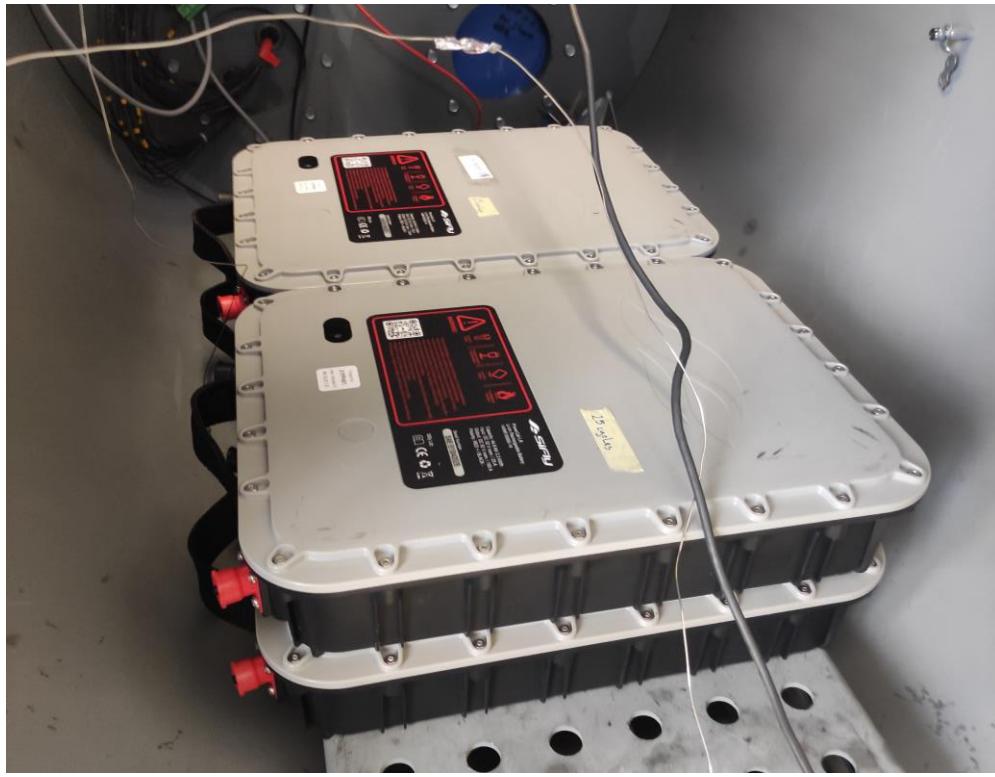
3.4 T.1 Altitude simulation

Method of measurement according to:						
UN Manual of Tests and Criteria, Part III, Section 38.3, Lithium metal and lithium-ion batteries (UN ST/SG/AC.10/11/Rev.7+Amd.1:2021)						
Purpose of test:						
This test simulates air transport under low pressure conditions.						
Test procedure:						
Absolutely atmospheric pressure:	Less than 11.6 kPa					
Temperature:	20±5°C					
Test duration:	6 h					
Samples under test:	A, B, C, D					
Used test equipment:						
Digital Multimeter						
Type:	175	Serial no.:	51280454			
Manufacturer:	Fluke	Inventory no.	965			
Last calibration:	2021-06-02					
Balance						
Type:	DE15K5N	Ser. No.:	WD080060800			
Manufacturer:	Kern&Sohn	Inv. No:	548			
Last calibration:	2021-03-12					
Prüfkammer						
Type:	PK1	Serial no.:	110876			
Manufacturer:	Primara Test- und Zertifizier-GmbH	Inventory no.	748			
Last calibration:	N/A					
Vakuumpumpe						
Type:	S16B	Serial no.:	10266			
Manufacturer:	Trivac LEYBOLD	Inventory no.	1036			

Last calibration:	N/A		
Piezoresistiver Drucktransmitter			
Type:	PAA-33X/80794	Serial no.:	676088
Manufacturer:	Keller Ges. für Druckmesstechnik GmbH	Inventory no.	706
Last calibration:	2020-03-13		
Data Logger			
Type:	GM10-2E0/E1	Serial no.:	S5U611709
Manufacturer:	Yokogawa	Inventory no.	716
Last calibration:	N/A		
Thermocouple			
Type:	Type J	Serial no.:	A2
Manufacturer:	TMH	Inventory no.	718
Last calibration:	2019-03-19		
Test result:			
Test requirements	<input checked="" type="checkbox"/> pass	<input type="checkbox"/> fail	<input type="checkbox"/> applied
Comment(s):			
Testing conducted:			
Person in charge:	Peter Filser	Date:	2021-12-13

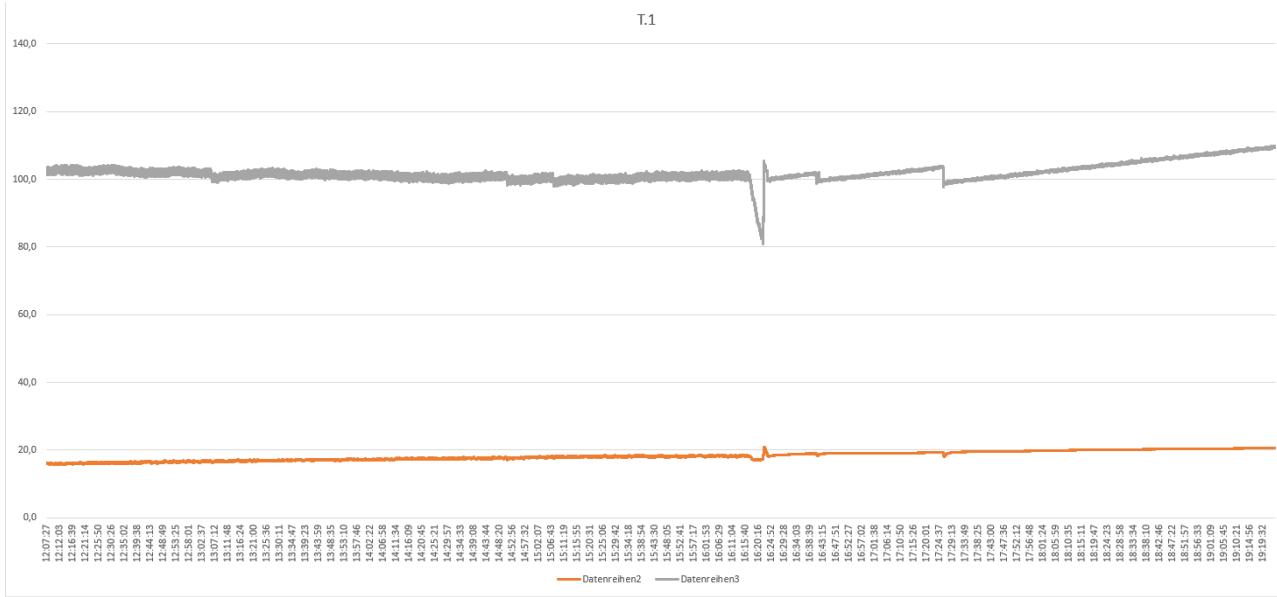
Pictures of the test setup:

Figure 6: Altitude simulation chamber



Pressure diagram:

Figure 7: Altitude simulation – Temperature/Pressure diagram



Test protocol:

Figure 8: Altitude simulation – test protocol

Sample No.	No. of cycles/state	Test Parameter						
		Voltage (V)		Min. value voltage (%)	Vloss (%)	Mass (g)	After test (g)	Max. mass loss (%)
		Before test	After test					
A	Charged 1. cycle	57,15	56,58	90	1,0	12500	12500	0,00
B	Charged 1. cycle	57,08	56,57		0,9	12500	12500	0,00
C	Charged 25. cycle	57,14	56,68		0,8	12500	12500	0,00
D	Charged 25. cycle	57,16	56,53		1,1	12500	12500	0,00

3.5 T.2 Thermal test

Method of measurement according to: UN Manual of Tests and Criteria, Part III, Section 38.3, Lithium metal and lithium-ion batteries (ST/SY/AC.10/11/Rev.7+Amd.1:2021)															
Purpose of test: This test assesses cell and battery seal integrity and internal electrical connections. The test is conducted using rapid and extreme temperature changes.															
Test procedure:															
<table border="1"><tr><td>Temperature min.:</td><td>-40±2°C</td></tr><tr><td>Temperature max.:</td><td>+72±2 °C</td></tr><tr><td>Maximum test interval between test temperature extremes:</td><td>0,5 h</td></tr><tr><td>Storage time at each temperature:</td><td>12h</td></tr><tr><td>Number of cycles:</td><td>10</td></tr><tr><td>Devices under test:</td><td>A, B, C, D</td></tr></table>				Temperature min.:	-40±2°C	Temperature max.:	+72±2 °C	Maximum test interval between test temperature extremes:	0,5 h	Storage time at each temperature:	12h	Number of cycles:	10	Devices under test:	A, B, C, D
Temperature min.:	-40±2°C														
Temperature max.:	+72±2 °C														
Maximum test interval between test temperature extremes:	0,5 h														
Storage time at each temperature:	12h														
Number of cycles:	10														
Devices under test:	A, B, C, D														
Used test equipment:															
Climatic chamber															
Type:	WK3-340/40	Serial no.:	58226103910010												
Manufacturer:	Weiss Umwelttechnik	Inventory no.	094												
Last calibration:	2020-11-11														
Balance															
Type:	DE15K5N	Ser. No.:	WD080060800												
Manufacturer:	Kern&Sohn	Inv. No.:	548												
Last calibration:	2021-03-12														
Digital Multi Meter															
Type:	175	Serial no.:	51280454												
Manufacturer:	Fluke	Inventory no.	965												
Last calibration:	2021-06-02														
Test result:															
Test requirements	<input checked="" type="checkbox"/> pass	<input type="checkbox"/> fail	<input type="checkbox"/> applied												

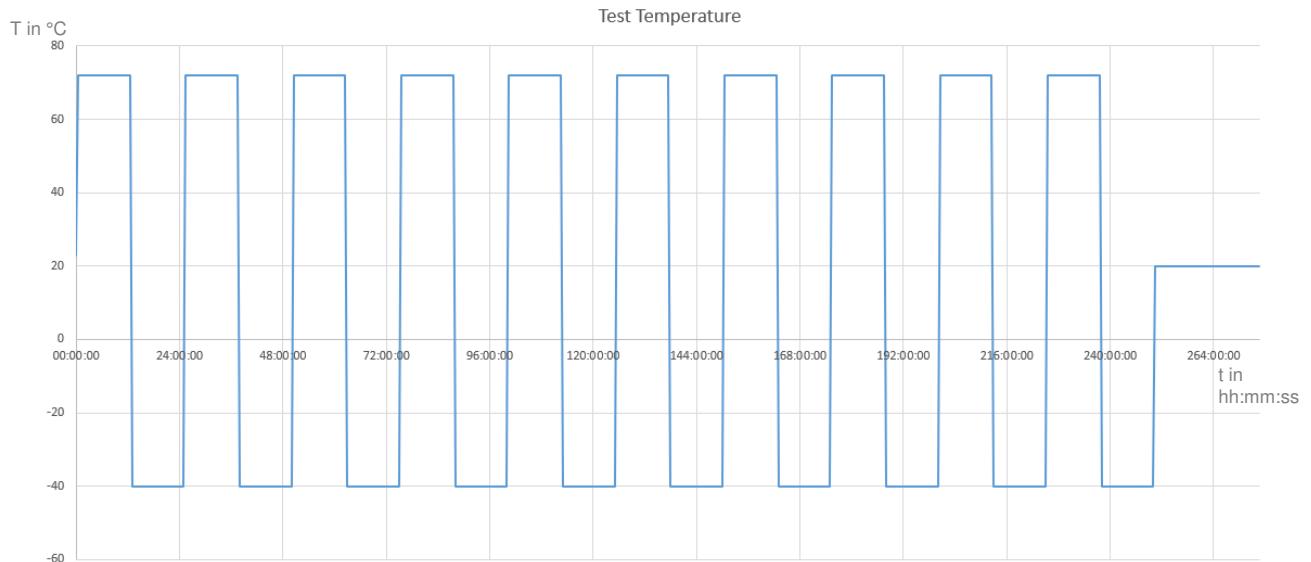
Comment(s):			
Testing conducted:			
Person in charge:	Peter Filser	Date:	2021-12-23 – 2022-01-03

Pictures of the test setup:
 A photograph showing two white rectangular specimens or panels stacked vertically inside a large, dark, metallic climatic test chamber. The top panel has a red and black warning label with text and symbols. The bottom panel also has a similar label. The chamber's interior walls are made of reflective metal.



Temperature diagram:

Figure 10: Thermal test – temperature diagram



Test protocol:

Figure 11: Thermal test – test protocol

Sample No.	No. of cycles/state	Test Parameter						
		Voltage (V)		Min. value voltage (%)	Vloss (%)	Mass (g)		Max. mass loss (%)
		Before test	After test			Before test	After test	
A	Charged 1. cycle	56,58	55,73	90	1,5	12500	12500	0
B	Charged 1. cycle	56,57	55,77		1,4	12500	12500	0
C	Charged 25. cycle	56,68	55,95		1,3	12500	12500	0
D	Charged 25. cycle	56,53	55,63		1,6	12500	12500	0

3.6 T.3 Vibration

Method of measurement according to: UN Manual of Tests and Criteria, Part III, Section 38.3, Lithium metal and lithium-ion batteries (ST/SI.AC.10/11/Rev.7+Amd.1:2021)					
Purpose of test: This test simulates vibration during transport.					
Test procedure:					
Wave form.: Sinusoidal					
Logarithmic frequency sweep.:		Frequency:	Peak acceleration/amplitude:		
		7 Hz-18 Hz	1g _n		
		18 Hz-50 Hz	0,8 mm		
		50 Hz – 200 Hz	8g _n		
Number of sweeps per axis: (7 Hz – 200 Hz – 7 Hz)		12			
Number of axis to be tested:		3 mutually perpendicular mounting positions of the cell (one should be perpendicular to the terminal face).			
Temperature:		20±5°C			
Test time each axis:		3 h			
Total test duration:		9 h per sample			
Devices under test:		A, B, C, D			
Number of axis to be tested:		3 mutually perpendicular mounting positions of the cell (one should be perpendicular to the terminal face).			
Used test equipment:					
Shaker system					
Type:	TV 59327	Serial no.:	174-09		
Manufacturer:	TIRA GmbH	Inventory no.	934		
Last calibration:	N/A				
Amplifier					
Type:	A 3083040	Serial no.:	148/08		
Manufacturer:	TIRA GmbH	Inventory no.	936		
Last calibration:	N/A				

Acceleration sensor			
Type:	353B03	Serial no.:	LW217041
Manufacturer:	PCB SYNOTECH	Inventory no.	712
Last calibration:	2019-03-14		
Type:	M352C65	Serial no.:	LW246439
Manufacturer:	PCB SYNOTECH	Inventory no.	715
Last calibration:	2018-03-21		
Vibration Control System			
Type:	Medallion III	Serial no.:	9536D551
Manufacturer:	VR Vibration Research		
Last calibration:	2021-02-26		
Balance			
Type:	DE15K5N	Ser. No:	WD080060800
Manufacturer:	Kern&Sohn	Inv. No:	548
Last calibration:	2021-03-12		
Test result:			
Test requirements	<input checked="" type="checkbox"/> pass	<input type="checkbox"/> fail	<input type="checkbox"/> applied
Comment(s):			
Testing conducted:			
Person in charge:	Peter Filser	Date:	2022-01-07–2022-01-11

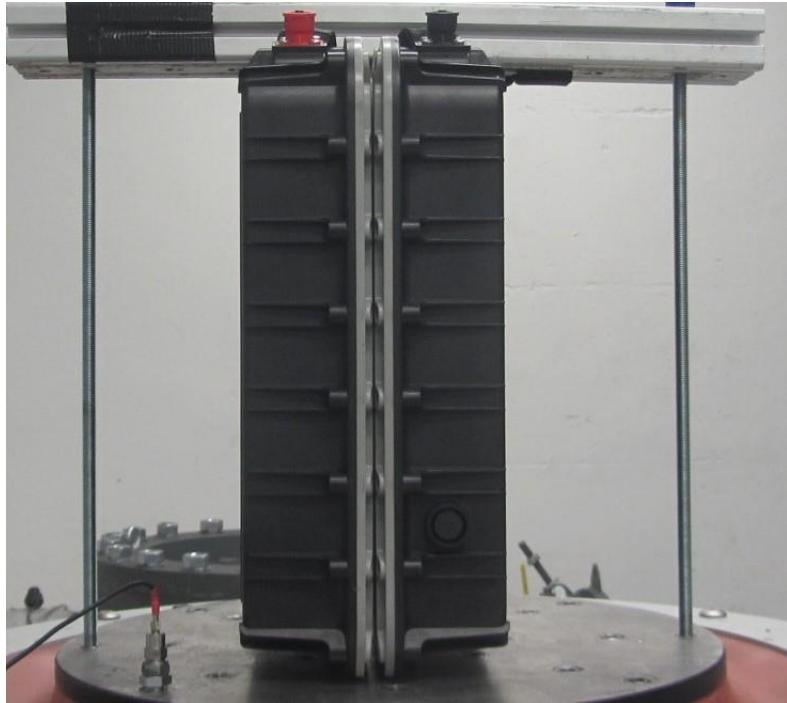
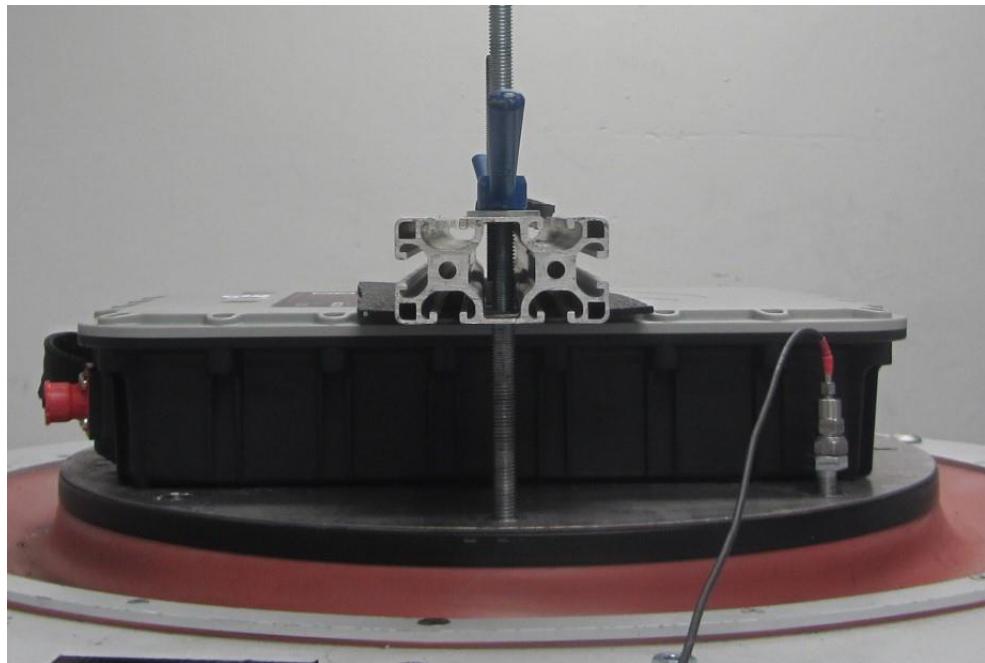
Pictures of the test setup:**Figure 12: Specimens – fitted towards X- direction (test procedure conducted in several parts)****Figure 13: Specimens – fitted towards Y – direction (test procedure conducted in several parts)**

Figure 14: Specimens – fitted towards Z – direction (test procedure conducted in several parts)



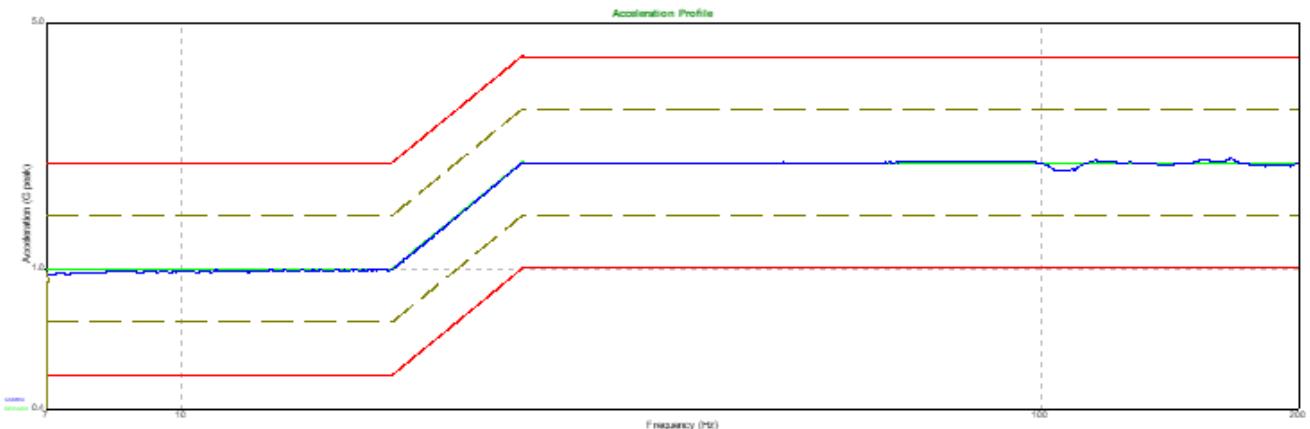
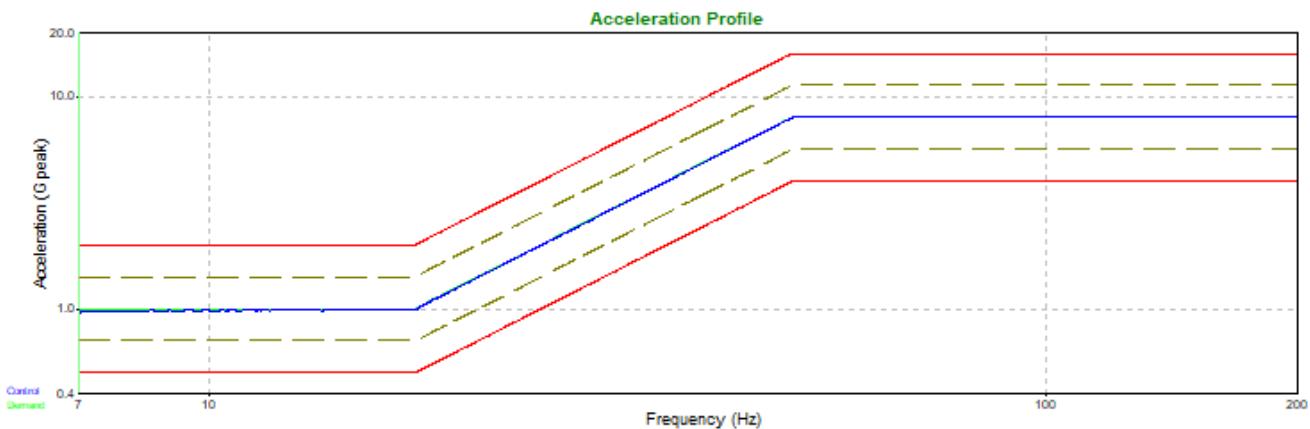
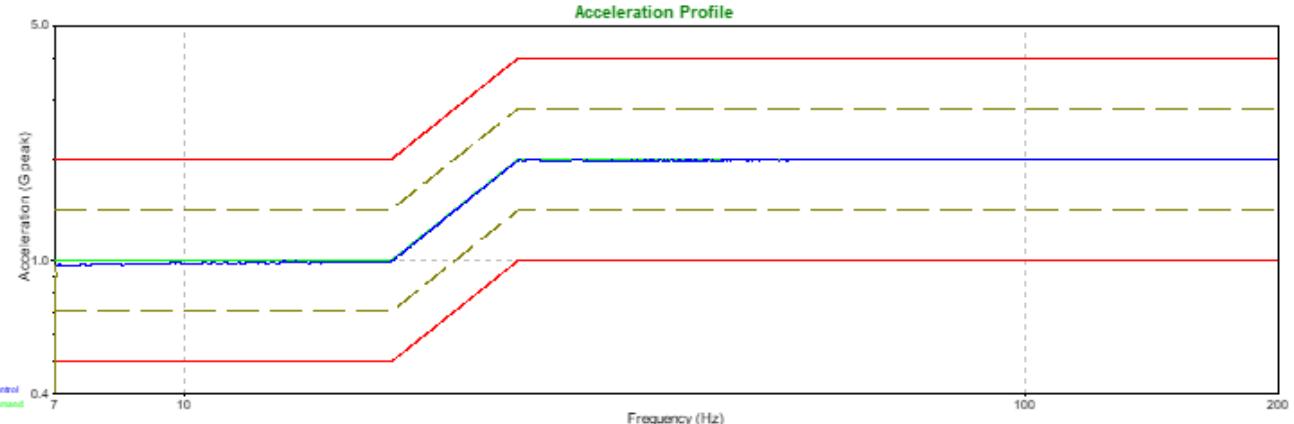
Vibration diagram X- direction:**Figure 15: Vibration diagram – X-direction (test procedure conducted in several parts)****Vibration diagram Y- direction:****Figure 16: Vibration diagram – Y-direction(test procedure conducted in several parts)****Vibration diagram Z - direction:**

Figure 17: Vibration diagram – Z – direction (test procedure conducted in several parts)



Test protocols:

Figures 18: Vibration simulation – test protocol

Sample No.	No. of cycles/state	Test Parameter						
		Voltage (V)		Min. value voltage (%)	Vloss (%)	Mass (g)		Max. mass loss (%)
		Before test	After test			Before test	After test	
A	Charged 1. cycle	55,73	55,23	90	0,9	12500	12500	0
B	Charged 1. cycle	55,77	55,33		0,8	12500	12500	0
C	Charged 25. cycle	55,95	55,33		1,1	12500	12500	0
D	Charged 25. cycle	55,63	55,13		0,9	12500	12500	0

3.7 T.4 Shock

Method of measurement according to:						
UN Manual of Tests and Criteria, Part III, Section 38.3, Lithium metal and lithium-ion batteries (ST/SY/AC.10/11/Rev.7+Amd.1:2021)						
Purpose of test:						
This test simulates possible impacts during transport.						
Test procedure:						
Wave form.:	Half-sine					
Peak acceleration:	50gn (big batteries)					
Pulse duration:	11 ms (big batteries)					
Number of shocks per half-axis:	3					
Number of axis to be tested:	6 half-axes (3 in the positive direction and 3 in the negative direction)					
Total number of shocks:	18					
Temperature:	20±5°C					
Devices under test:	A, B, C, D					
Used test equipment:						
Acceleration sensor						
Type:	353B03	Serial no.:	LW217039			
Manufacturer:	PCB SYNOTECH	Inventory no.	713			
Last calibration:	2021-05-28					
Vibration Control System						
Type:	Medallion II	Serial no.:	952670e3			
Manufacturer:	VR Vibration Research	Inventory no.	711			
Last calibration:	2021-05-25					
Shock Test System						
Type:	HSTK10	Serial no.:	-			
Manufacturer:	Labtone test Equipment Co., Ltd	Inventory no.	872			
Last calibration:	N/A					
Balance						
Type:	DE15K5N	Ser. No:	WD080060800			
Manufacturer:	Kern&Sohn	Inv. No:	548			
Last calibration:	2021-03-12					
Digital Multimeter						

Type:	175	Serial no.:	51280454
Manufacturer:	Fluke	Inventory no.	965
Last calibration:	2021-06-02		
Test result:			
Test requirements	<input checked="" type="checkbox"/> pass	<input type="checkbox"/> fail	<input type="checkbox"/> applied
Comment(s):			
Testing conducted:			
Person in charge:	Peter Filser	Date:	2022-01-12 – 2022-01-14

Pictures of the test setup:

Figure 19: Specimens fitted towards X Direction (test procedure conducted in several parts)



Figure 20: Specimens fitted towards Y Direction (test procedure conducted in several parts)

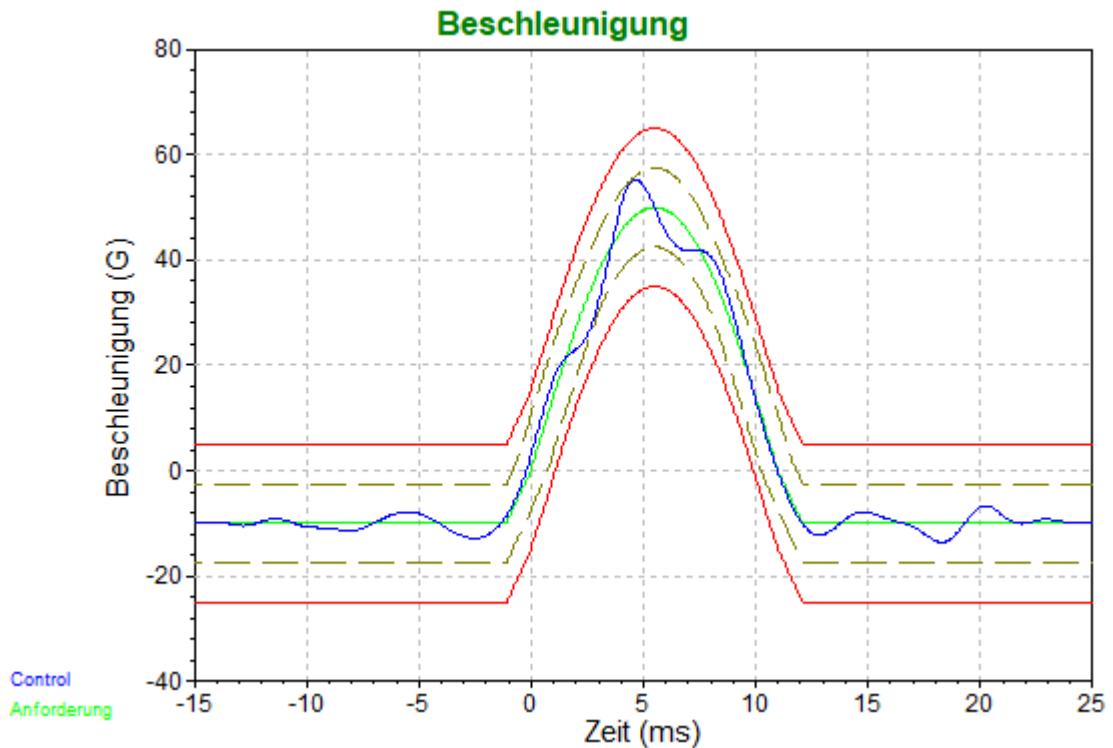


Figure 21: Specimens fitted towards Z Direction (test procedure conducted in several parts)

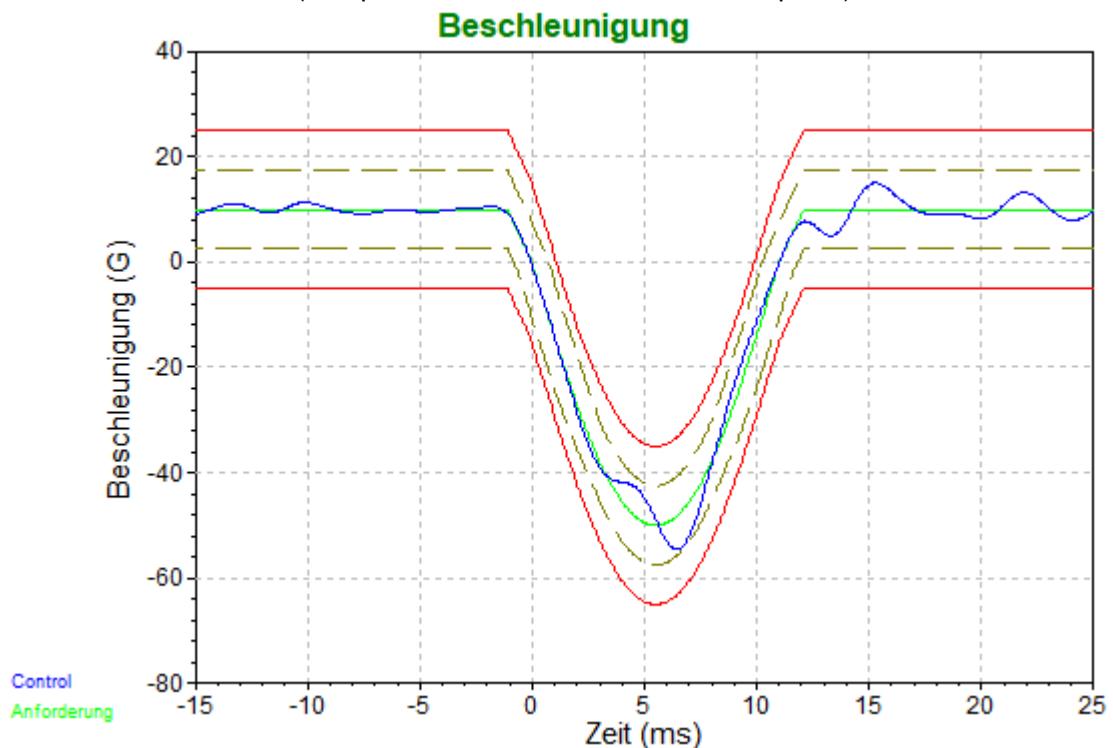


Shock diagram +X direction:

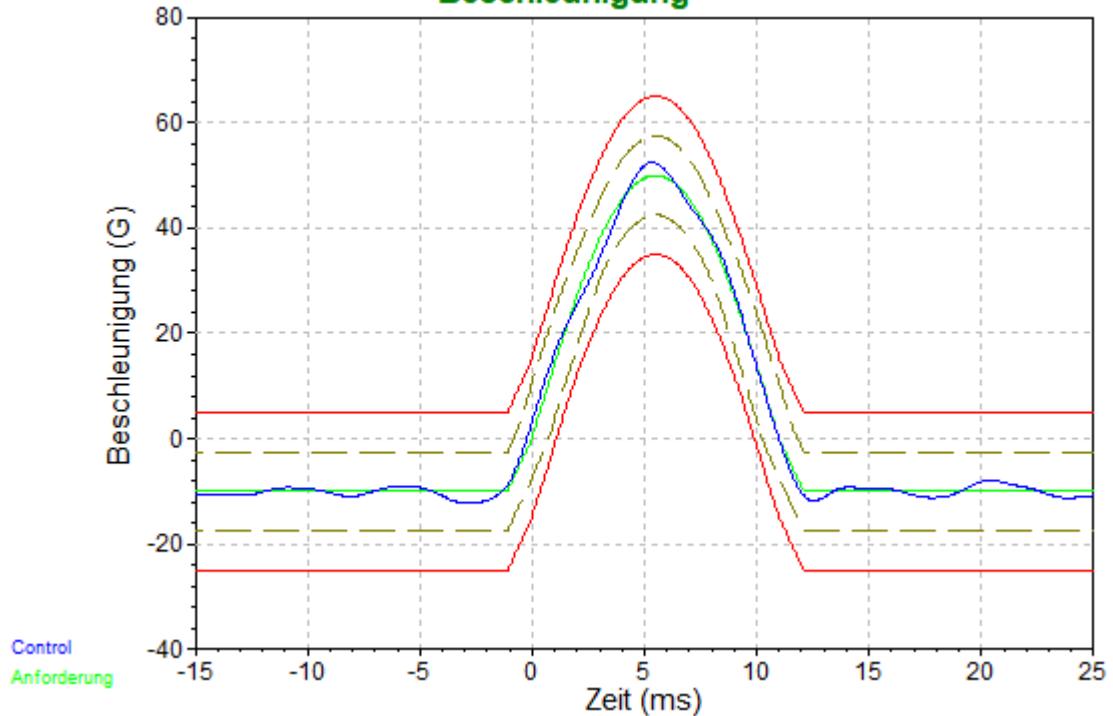
Figures 22-27: Shock diagram
X+ (test procedure conducted in several parts)



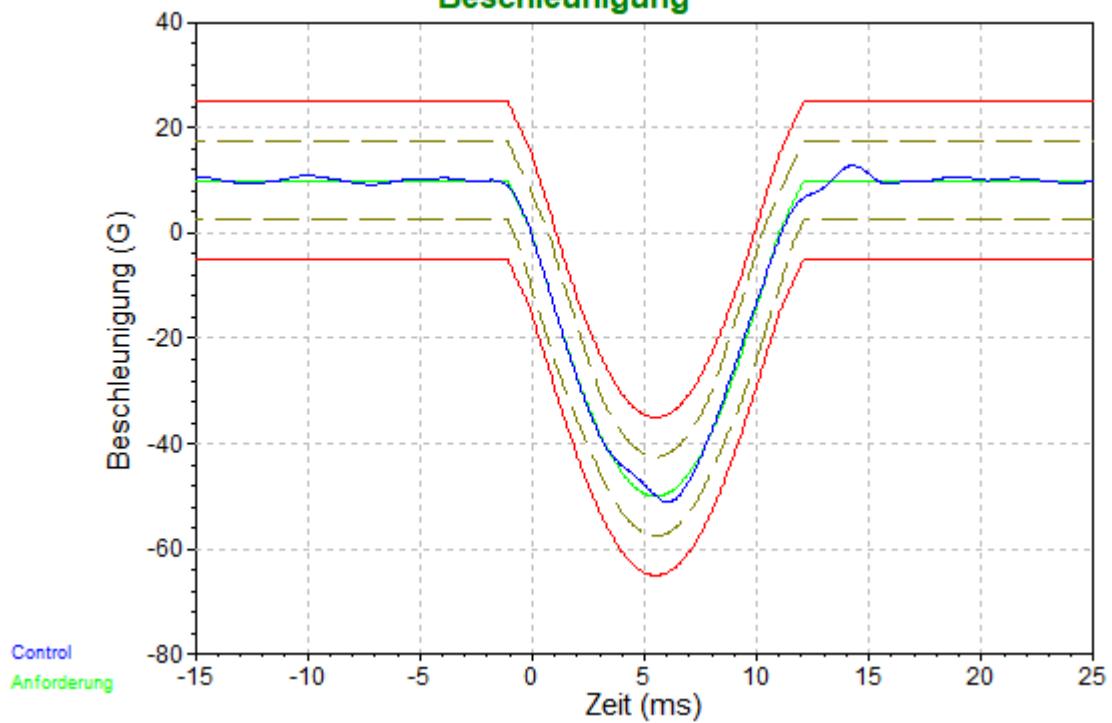
X- (test procedure conducted in several parts)



Y+ (test procedure conducted in several parts)

Beschleunigung

Y- (test procedure conducted in several parts)

Beschleunigung

Z+ (test procedure conducted in several parts)

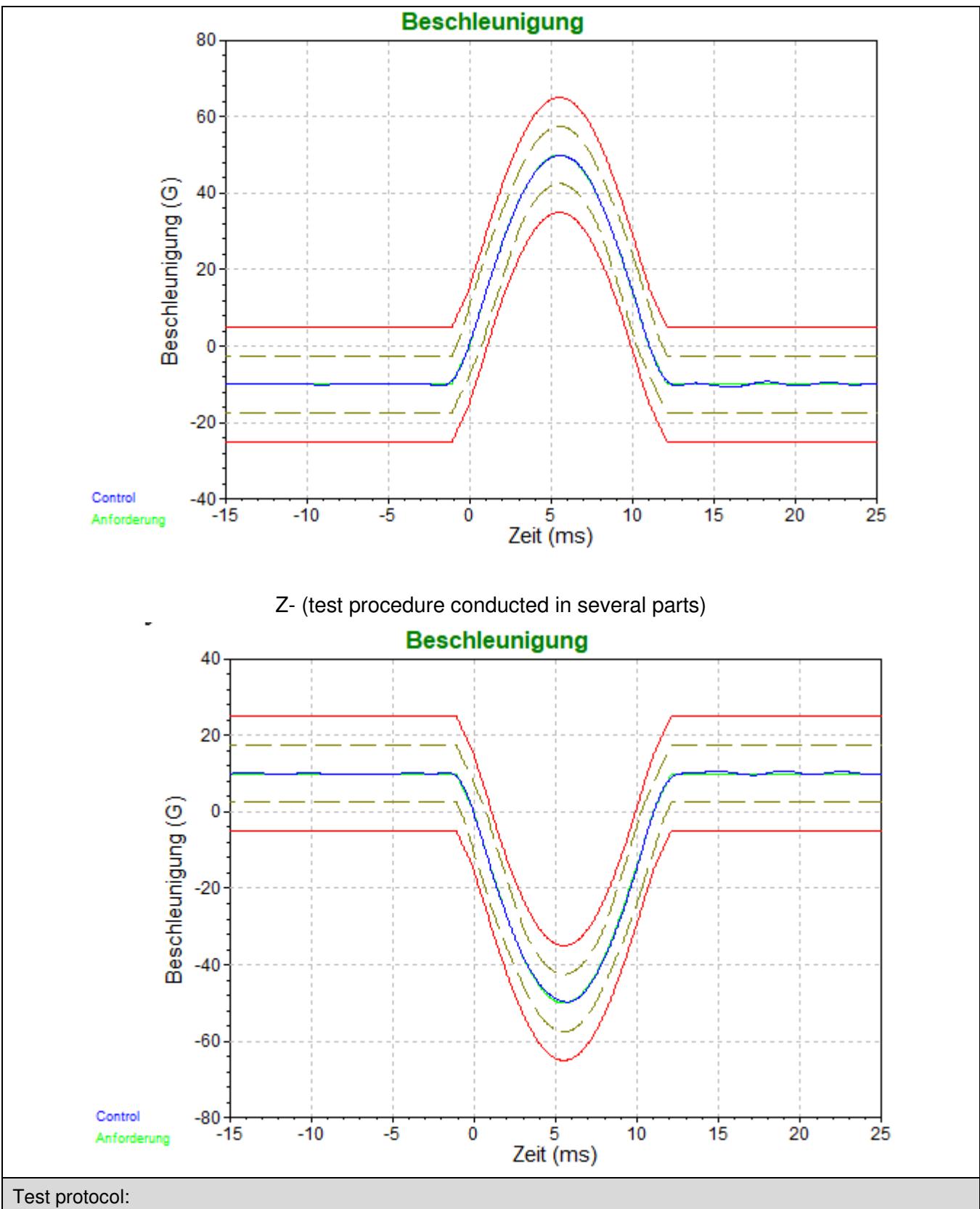


Figure 28: Shock – test protocol

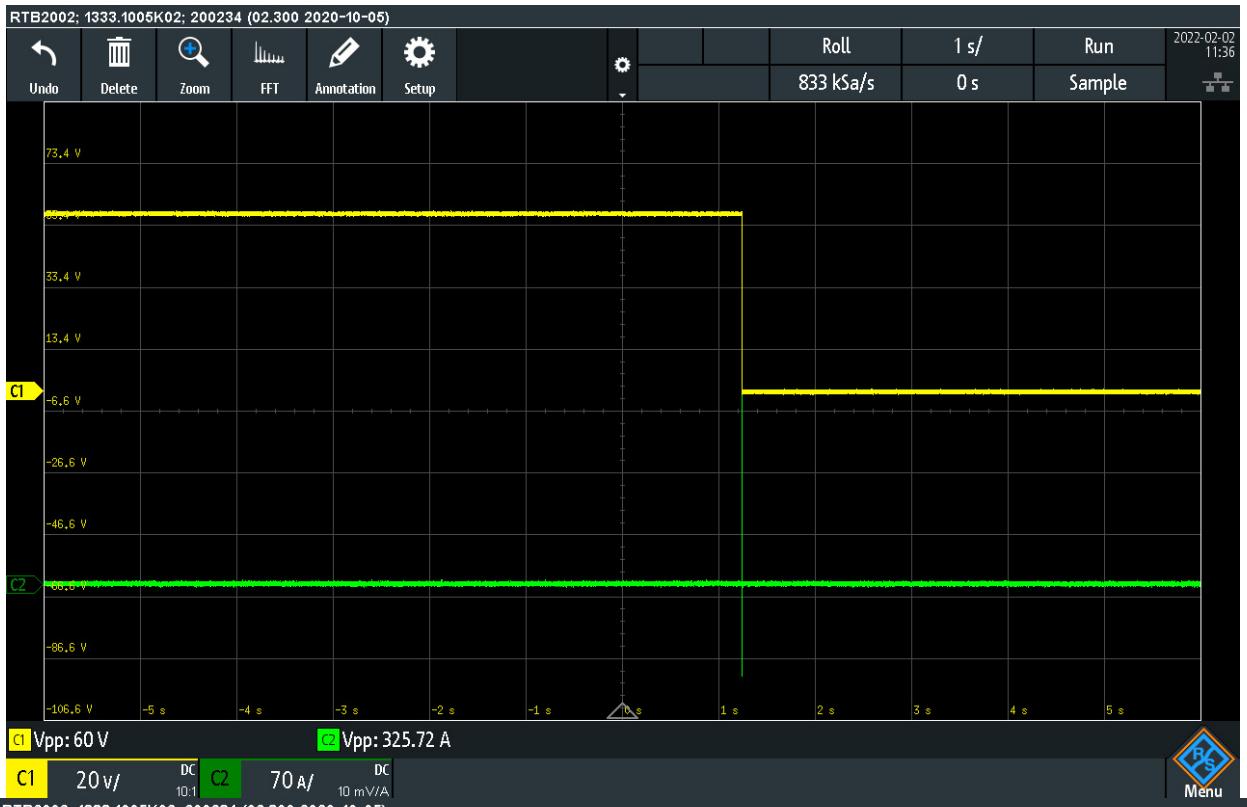
Sample No.	No. of cycles/state	Test Parameter						
		Voltage (V)		Min. value voltage (%)	Vloss (%)	Mass (g)		Max. mass loss (%)
		Before test	After test			Before test	After test	
A	Charged 1. cycle	55,23	54,90	90	0,6	12500	12500	0
B	Charged 1. cycle	55,33	55,05		0,5	12500	12500	0
C	Charged 25. cycle	55,33	54,94		0,7	12500	12500	0
D	Charged 25. cycle	55,13	54,91		0,4	12500	12500	0

3.8 T.5 External short circuit

Method of measurement according to:						
UN Manual of Tests and Criteria, Part III, Section 38.3, Lithium metal and lithium-ion batteries (ST/SI.AC.10/11/Rev.7+Amd.1:2021)						
Purpose of test:						
This test simulates an external short circuit.						
Test procedure:						
Temperature:	57 ± 4 °C					
Total external resistance:	< 100 mΩ					
Testing duration:	1 h					
Observation time:	6 h					
Preconditioning time:	> 12 h					
Devices under test:	A, B, C, D					
Used test equipment:						
Oscilloscope						
Type:	RTB2002	Ser. No:	1333.1005K02-200175-zN			
Manufacturer:	Rohde & Schwarz	Inv. No:	957			
Last calibration:	2021-05-05					
Temperature meter / Datalogger						
Type:	SDL200	Ser. No:	H409518			
Manufacturer:	extech	Inv. No:	986			
Last calibration:	2021-06-21					
Thermocouple type K						
Type:	TT-KI-30-SLE-300M-DAkkS-T6	Serial no.:	N/A			
Manufacturer:	OMEGA Engineering inc	Inventory no.	643			
Last calibration:	2021-08-23					
Climatic chamber						
Type:	WK3-340/40	Serial no.:	58226103910010			

Manufacturer:	Weiss Umwelttechnik	Inventory no.:	094
Last calibration:	2020-11-11		

Figures 30-31: External short circuit – Test graphs



Test protocol:

Figure 32: External short circuit – test protocol

Sample No.	No. of cycles/state	Test Parameter				
		Temp < +170°C	No disassembly	No rupture	No fire	Result
A	Charged 1. cycle	passed	passed	passed	passed	passed
B	Charged 1. cycle	passed	passed	passed	passed	passed
C	Charged 25. cycle	passed	passed	passed	passed	passed
D	Charged 25. cycle	passed	passed	passed	passed	passed

3.9 T.7 Overcharge

Method of measurement according to:			
UN Manual of Tests and Criteria, Part III, Section 38.3, Lithium metal and lithium-ion batteries (ST/SY/AC.10/11/Rev.7+Amd.1:2021)			
Purpose of test:			
This test evaluates the ability of a rechargeable battery to withstand an overcharge condition.			
Test procedure:			
Charge current:	50	A	
Charge Voltage:	69,6	V	
Temperature:	20±5°C		
Testing duration:	24 h		
Observation time:	7 days		
Devices under test:	E, F, G, H		
Used test equipment:			
Temperature meter / Datalogger			
Type:	SDL200	Ser. No:	H409518
Manufacturer:	extech	Inv. No:	986
Last calibration:	2021-06-21		
Thermocouple type K			
Type:	TT-KI-30-SLE-300M-DAKS-T6	Serial no.:	N/A
Manufacturer:	OMEGA Engineering inc	Inventory no.	643
Last calibration:	2021-08-23		
Digital Multimeter			
Type:	175	Ser. No:	51280454
Manufacturer:	Fluke	Inv. No:	965
Last calibration:	2021-06-02		
Regenerative Power Systems:			
Type:	IT-M3632	Ser. No:	803126073767080006

Manufacturer:	ITECH ELECTRONIC CO., LTD.	Inv. No:	1007
Last calibration:	N/A		
Type:	IT-M3632	Ser. No:	803126073767080002
Manufacturer:	ITECH ELECTRONIC CO., LTD.	Inv. No:	1008
Last calibration:	N/A		
Type:	IT-M3632	Ser. No:	803126073767080004
Manufacturer:	ITECH ELECTRONIC CO., LTD.	Inv. No:	1009
Last calibration:	N/A		
Type:	IT-M3632	Ser. No:	803126073767080001
Manufacturer:	ITECH ELECTRONIC CO., LTD.	Inv. No:	1010
Last calibration:	N/A		
<hr/>			
Clampmeter			
Type:	365	Ser. No:	39100076WS
Manufacturer:	Fluke	Inv. No:	642
Last calibration:	2021-12-08		
<hr/>			
Balance			
Type:	DE15K5N	Ser. No:	WD080060800
Manufacturer:	Kern&Sohn	Inv. No:	548
Last calibration:	2021-03-12		
<hr/>			
Ambient Logger			
Type:	Saveris 2 (H1)	Ser. No:	54636198
Manufacturer:	Testo Se & Co. KGaA	Inv. No:	755
Last calibration:	2021-05-03		
<hr/>			
Test result:			
Test requirements	<input checked="" type="checkbox"/> pass	<input type="checkbox"/> fail	<input type="checkbox"/> applied
Comment(s):			
Testing conducted:			

Person in charge:	Peter Filser	Date:	2022-02-17 – 2022-03-02
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Test protocol:

Figure 33: Overcharge – test protocol

Sample No.	No. of cycles/state	Test results		
		No disassembly	No fire	Result
E	Charged 1. cycle	No	No	Passed
F	Charged 1. cycle	No	No	Passed
G	Charged 25. cycle	No	No	Passed
H	Charged 25. cycle	No	No	Passed

Charge current (A)	69,60
Charge Voltage(V)	50,00

4. Summary

Lithium cell or battery test summary in accordance with sub/section 38.3 of Manual of Tests and Criteria	
Test item description	
Unit	Battery pack for electric hydrofoil
Trademark	SiFly
Manufacturer	Sifly AI Ltd.
Model/Type reference	SiFly PowerCell LR
Manufacturer	
Manufacturer's name	Sifly AI Ltd.
Address	15-17 Tintyava str, 1113 Sofia, Bulgaria
Phone number	+359887601018
E-mail address	hello@sifly.global
Website	https://sifly.global/
Factory	
Factory's name	Daisy Technology Ltd.
Address	1 Ribarska Street, 5300 Gabrovo, Bulgaria
Phone number	+359899997413
E-mail address	diliev@daisytchbg.com
Website	https://daisy.bg/
Testing laboratory	
Name	Kiwa Primara GmbH
Address	Gewerbestraße 28, 87600 Kaufbeuren; Germany
Phone number	+49 (0) 40 / 30 39 49 - 60
E-mail address	primara@kiwa.com
Website	www.kiwa.de/primara
Test report	
Number	21PP451-02_0
Date of issue	2022-04-11
Battery description	
Type	SiFly PowerCell LR Li-Ion 14S14P
Mass	12500g
Energy	2300 Wh
Physical description	Solid enclosure, 300 x 390 x 80 mm
Model name	SiFly PowerCell LR
Test result	
All performed tests were successfully passed	

Tests and criteria	Requirement	Verdict
T.1 Altitude simulation	Cells and batteries meet this requirement if there is no mass loss, no leakage, no venting, no disassembly, no rupture, and no fire and if the open circuit voltage	Passed
T.2 Thermal test		Passed

T.3 Vibration	of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.	Passed
T.4 Shock		Passed
T.5 External short circuit	Cells and batteries meet this requirement if their external temperature does not exceed 170°C and there is no disassembly, no rupture, and no fire during the test and within six hours after test.	Passed
T.6 Impact	Cells and component cells meet this requirement if their external temperature does not exceed 170°C and there is no disassembly and no fire within six hours of this test.	N/A
T.7 Overcharge	Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days of this test.	Passed
T.8: Forced discharge	Primary or rechargeable cells meet this requirement if there is no disassembly and no fire within seven days of this test.	N/A

END OF THE REPORT