





TEST REPORT N°: ARED-19AP3591YTSHP

### HISTORICAL OF SAMPLE RECEIVED

LCIE CHINA RECORDED N°	DETAIL OF THE SAMPLE	SPECIAL REMARKS
SH190515/020	Original samples	None

### COPY OF RATING PLATE



NOTE: The actual date code will be marked on the product after production.

### TEST PERFORMED / RESULTS

CLAUSE	ITEM	CONCLUSION
<input checked="" type="checkbox"/> 38.3.4.1	Test T.1: Altitude simulation	PASS
<input checked="" type="checkbox"/> 38.3.4.2	Test T.2: Thermal test	PASS
<input checked="" type="checkbox"/> 38.3.4.3	Test T.3: Vibration	PASS
<input checked="" type="checkbox"/> 38.3.4.4	Test T.4: Shock	PASS
<input checked="" type="checkbox"/> 38.3.4.5	Test T.5: External short circuit	PASS
<input checked="" type="checkbox"/> 38.3.4.6	Test T.6: Impact / Crush: Impact test	PASS
<input type="checkbox"/> 38.3.4.6	Test T.6: Impact / Crush: Crush test	NA
<input checked="" type="checkbox"/> 38.3.4.7	Test T.7: Overcharge	PASS
<input checked="" type="checkbox"/> 38.3.4.8	Test T.8: Forced discharge	PASS



TEST REPORT N°: ARED-19AP3591YTSHP

### THE NUMBER AND CONDITION OF THE SAMPLES

Table A	When testing primary cells and batteries under tests T.1 to T.5 the following shall be tested in the quantity indicated:	
	Number and condition	Login number
	<input type="checkbox"/> Ten cells in undischarged states;	None
	<input type="checkbox"/> Ten cells in fully discharged states;	None
	<input type="checkbox"/> Four small batteries in undischarged states;	None
	<input type="checkbox"/> Four small batteries in fully discharged states;	None
	<input type="checkbox"/> Four large batteries in undischarged states; and	None
	<input type="checkbox"/> Four large batteries in fully discharged states.	None

Table B	When testing rechargeable cells and batteries under tests T.1 to T.5 the following shall be tested in the quantity indicated:	
	Number and condition	Login number
	<input type="checkbox"/> Five cells at first cycle, in fully charged states;	None
	<input type="checkbox"/> Five cells after 25 cycles ending in fully charged states;	None
	<input checked="" type="checkbox"/> Four small batteries at first cycle, in fully charged states;	Q46N01~Q46N04
	<input checked="" type="checkbox"/> Four small batteries after 25 cycles ending in fully charged states;	Q46N05~Q46N08
	<input type="checkbox"/> Two large batteries at first cycle, in fully charged states; and	None
	<input type="checkbox"/> Two large batteries after 25 cycles ending in fully charged states.	None

Table C	When testing primary and rechargeable cells under test T.6, the following shall be tested in the quantity indicated:	
	Number and condition	Login number
	<input type="checkbox"/> For primary cells, five cells in undischarged states and five cells in fully discharged states;	None
	<input type="checkbox"/> For component cells of primary batteries, five cells in undischarged states and five cells in fully discharged states;	None
	<input type="checkbox"/> For rechargeable cells, five cells at first cycle at 50% of the design rated capacity;	None
	<input type="checkbox"/> For rechargeable cells, five cells after 25 cycles ending at 50% of the design rated capacity; and	None
	<input checked="" type="checkbox"/> For component cells of rechargeable batteries, five cells at first cycle at 50% of the design rated capacity; and	Q46N09~Q46N13
	<input checked="" type="checkbox"/> For component cells of rechargeable batteries, five cells after 25 cycles ending at 50% of the design rated capacity.	Q46N14~Q46N18



**TEST REPORT N°: ARED-19AP3591YTSHP**

Table D	When testing rechargeable batteries or rechargeable single cell batteries under test T.7, the following shall be tested in the quantity indicated:	
	Number and condition	Login number
<input checked="" type="checkbox"/>	Four small batteries at first cycle, in fully charged states;	Q46N19~Q46N22
<input checked="" type="checkbox"/>	Four small batteries after 25 cycles ending in fully charged states;	Q46N23~Q46N26
<input type="checkbox"/>	Two large batteries at first cycle, in fully charged states; and	None
<input type="checkbox"/>	Two large batteries after 25 cycles ending in fully charged states.	None

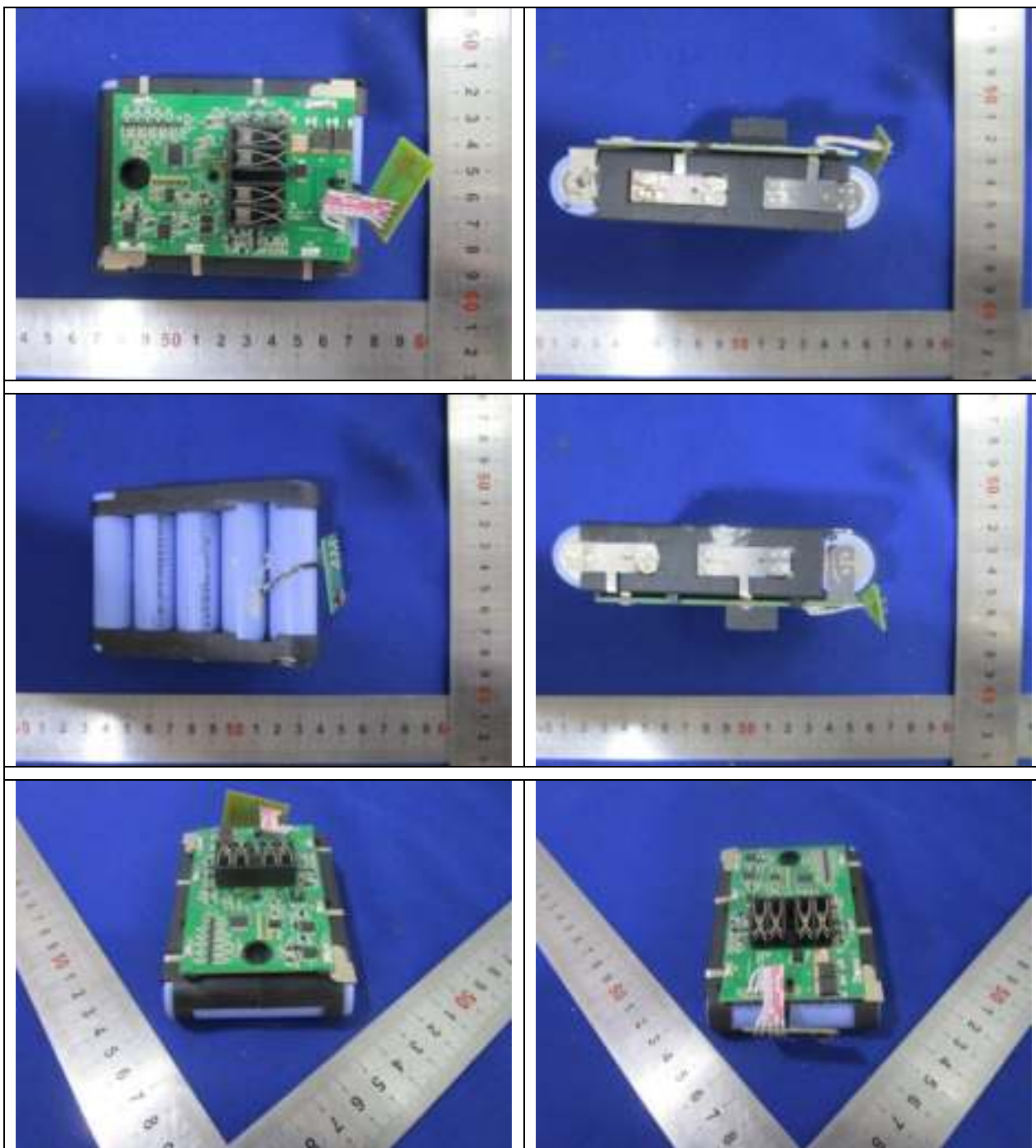
Table E	When testing primary and rechargeable cells and component cells under test T.8, the following shall be tested in the quantity indicated:	
	Number and condition	Login number
<input type="checkbox"/>	Ten primary cells in fully discharged states;	None
<input type="checkbox"/>	Ten primary component cells in fully discharged states;	None
<input type="checkbox"/>	Ten rechargeable cells, at first cycle in fully discharged states;	None
<input checked="" type="checkbox"/>	Ten rechargeable component cells, at first cycle in fully discharged states;	Q46N27~Q46N36
<input type="checkbox"/>	Ten rechargeable cells after 25 cycles ending in fully discharged states; and	None
<input checked="" type="checkbox"/>	Ten rechargeable component cells after 25 cycles ending in fully discharged states.	Q46N37~Q46N46

TEST REPORT N°: ARED-19AP3591YTSHP

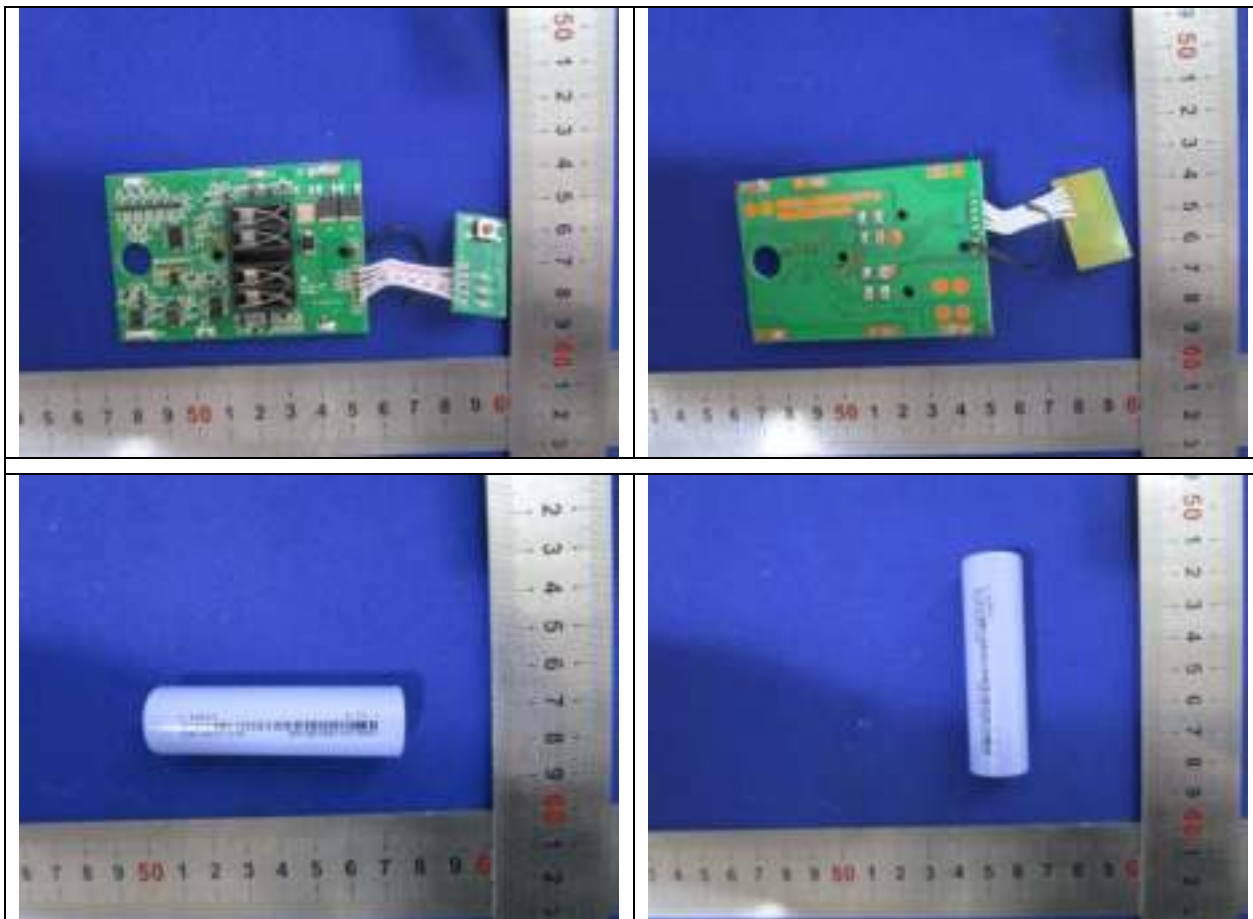
**PICTURE OF THE SAMPLE TESTED**



TEST REPORT N°: ARED-19AP3591YTSHP



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Test item particulars	
Appearance:	Li-ion Battery
Type of appliance:	Lithium ion
Type / model:	DF20V1902 (5INR19/66)
Rated Voltage:	20V
Rated capacity:	2000mAh
Rated energy:	40Wh
Trademark:	-
Manufacturer:	Nantong DFORCE Powertools Co., Ltd.
Recommend charging method declared by the manufacturer:	With charger
Discharge current:	400mA
Specified final voltage:	15V
Maximum charging voltage:	21V
Maximum charging current:	4A
Maximum discharge current:	20A
Cells number:	5
Permutation of cells:	Connection in series
Appearance of cell:	Cylindrical cell
Cell model:	INR18650-20P
Capacity of cell:	2000mAh
Manufacturer of cells:	Hengdian Group DMEGC Magnetics Co., Ltd.
Cell report for UN38.3	-
Other information on battery:	-

Possible test case verdicts:	
- test object does meet the requirement :	P (Pass)
- test case does not apply to the test object :	NA (Not Applicable)
- test object does not meet the requirement :	F (Fail)
- test object does not demand	ND (Not Demanded)
General remarks:	
<p>"(See remark #)" refers to a remark appended to the report.          Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</p>	





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TEST REPORT N°: ARED-19AP3591YTSHP

UN 38.3											
Clause	Requirement + Test	Result - Remark	Verdict								
<b>38.3.2.3</b>	<b>Mass loss</b>		<b>P</b>								
	<p>Mass loss means a loss of mass that exceeds the values in Table 38.3.1 below</p> <p style="text-align: center;"><b>Table 38.3.1: Mass loss limit</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Mass <i>M</i> of cell or battery</th> <th>Mass loss limit</th> </tr> </thead> <tbody> <tr> <td><math>M &lt; 1 \text{ g}</math></td> <td>0.5%</td> </tr> <tr> <td><math>1 \text{ g} \leq M \leq 75 \text{ g}</math></td> <td>0.2%</td> </tr> <tr> <td><math>M &gt; 75 \text{ g}</math></td> <td>0.1%</td> </tr> </tbody> </table>	Mass <i>M</i> of cell or battery	Mass loss limit	$M < 1 \text{ g}$	0.5%	$1 \text{ g} \leq M \leq 75 \text{ g}$	0.2%	$M > 75 \text{ g}$	0.1%		P
Mass <i>M</i> of cell or battery	Mass loss limit										
$M < 1 \text{ g}$	0.5%										
$1 \text{ g} \leq M \leq 75 \text{ g}$	0.2%										
$M > 75 \text{ g}$	0.1%										
	<p>In order to quantify the mass loss, the following procedure is provided:</p> $\text{Mass loss (\%)} = \frac{(M_1 - M_2)}{M_1} \times 100$		P								
	<p>Where <math>M_1</math> is the mass before the test and <math>M_2</math> is the mass after the test. When mass loss does not exceed the values in Table 38.3.1, it shall be considered as "no mass loss".</p>		P								
<b>38.3.4</b>	<b>Procedure</b>		<b>P</b>								
	Tests T.1 to T.5 shall be conducted in sequence on the same cell or battery.		P								
	Tests T.6 and T.8 shall be conducted using not otherwise tested cells or batteries.		P								
	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.		NA								
<b>38.3.4.1</b>	<b>Test T.1: Altitude simulation</b>		<b>P</b>								
38.3.4.1.2	Test procedure		P								
	Test cells and batteries shall be stored at a pressure of 11,6 kPa or less for at least six hours at ambient temperature ( $20 \pm 5 \text{ }^\circ\text{C}$ ).	See table 38.3.4.1	P								



**TEST REPORT N°: ARED-19AP3591YTSHP**

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
38.3.4.1.3	Requirement		P
	Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage 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.	No leakage, no venting, no disassembly, no rupture and no fire.	P
<b>38.3.4.2</b>	<b>Test T.2: Thermal test</b>		P
38.3.4.2.2	Test procedure		P
	Test cells and batteries are to be stored for at least six hours at a test temperature equal to $72 \pm 2$ °C, followed by storage for at least six hours at a test temperature equal to $-40 \pm 2$ °C. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature ( $20 \pm 5$ °C). For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.	See table 38.3.4.2	P
38.3.4.2.3	Requirement		P
	Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage 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.	No leakage, no venting, no disassembly, no rupture and no fire.	P



**TEST REPORT N°: ARED-19AP3591YTSHP**

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

<b>38.3.4.3</b>	<b>Test T.3: Vibration</b>		P
38.3.4.3.2	Test procedure		P
	Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.	See table 38.3.4.3	P
	The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12 kg (cells and small batteries), and for batteries with a gross mass of more than 12 kg (large batteries).		P
	For cells and small batteries: from 7 Hz a peak acceleration of 1 $g_n$ is maintained until 18 Hz is reached. The amplitude is then maintained at 0,8 mm (1,6 mm total excursion) and the frequency increased until a peak acceleration of 8 $g_n$ occurs (approximately 50 Hz). A peak acceleration of 8 $g_n$ is then maintained until the frequency is increased to 200 Hz.		P
	For large batteries: from 7 Hz to a peak acceleration of 1 $g_n$ is maintained until 18 Hz is reached. The amplitude is then maintained at 0,8 mm (1,6 mm total excursion) and the frequency increased until a peak acceleration of 2 $g_n$ occurs (approximately 25 Hz). A peak acceleration of 2 $g_n$ is then maintained until the frequency is increased to 200 Hz.		NA
38.3.4.3.3	Requirement		P
	Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire during the test and after the test and if the open circuit voltage of each test cell or battery directly after testing in its third perpendicular mounting position 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.	No leakage, no venting, no disassembly, no rupture and no fire.	P



**TEST REPORT N°: ARED-19AP3591YTSHP**

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

<b>38.3.4.4</b>	<b>Test T.4: Shock</b>		P									
38.3.4.4.2	Test procedure		P									
	Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery.	See table 38.3.4.4	P									
	Each cell or battery shall be subjected to a half-sine shock of peak acceleration of 150 g <sub>n</sub> and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock of peak acceleration of 50 g <sub>n</sub> and pulse duration of 11 milliseconds.		P									
	Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of the battery. The pulse duration shall be 6 milliseconds for small batteries and 11 milliseconds for large batteries. The formulas below are provided to calculate the appropriate minimum peak accelerations.		P									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Battery</th> <th style="width: 50%;">Minimum peak acceleration</th> <th style="width: 30%;">Pulse duration</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Small batteries</td> <td>                     150 g<sub>n</sub> or result of formula  <math>Acceleration(g_n) = \sqrt{\frac{100850}{mass^*}}</math>                       whichever is smaller                 </td> <td style="text-align: center;">6 ms</td> </tr> <tr> <td style="text-align: center;">Large batteries</td> <td>                     50 g<sub>n</sub> or result of formula  <math>Acceleration(g_n) = \sqrt{\frac{30000}{mass^*}}</math>                       whichever is smaller                 </td> <td style="text-align: center;">11 ms</td> </tr> </tbody> </table> <p style="font-size: small; margin-top: 5px;">* Mass is expressed in kilograms.</p>	Battery	Minimum peak acceleration	Pulse duration	Small batteries	150 g <sub>n</sub> or result of formula $Acceleration(g_n) = \sqrt{\frac{100850}{mass^*}}$  whichever is smaller	6 ms	Large batteries	50 g <sub>n</sub> or result of formula $Acceleration(g_n) = \sqrt{\frac{30000}{mass^*}}$  whichever is smaller	11 ms		P
Battery	Minimum peak acceleration	Pulse duration										
Small batteries	150 g <sub>n</sub> or result of formula $Acceleration(g_n) = \sqrt{\frac{100850}{mass^*}}$  whichever is smaller	6 ms										
Large batteries	50 g <sub>n</sub> or result of formula $Acceleration(g_n) = \sqrt{\frac{30000}{mass^*}}$  whichever is smaller	11 ms										
	Each cell or battery shall be subjected to three shocks in the positive direction and to three shocks in the negative direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.		P									
38.3.4.4.3	Requirement		P									
	Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage 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.	No leakage, no venting, no disassembly, no rupture and no fire.	P									



**TEST REPORT N°: ARED-19AP3591YTSHP**

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

<b>38.3.4.5</b>	<b>Test T.5: External short circuit</b>		P
38.3.4.5.2	Test procedure		P
	The cell or battery to be tested shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of $57 \pm 4$ °C, measured on the external case. This period of time depends on the size and designation of the cell or battery and should be assessed and documented. If this assessment is not feasible, the exposure time shall be at least 6 hours for small cells and small batteries, and 12 hours for large cells and large batteries.	See table 38.3.4.5	P
	Then the cell or battery at $57 \pm 4$ °C shall be subjected to a short circuit condition with a total external resistance of less than 0.1 ohm.		P
	This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to $57 \pm 4$ °C, or in the case of the large batteries, has decreased by half of the maximum temperature increase observed during the test and remains below that value.		P
	The short circuit and cooling down phases shall be conducted at least at ambient temperature.		P
38.3.4.5.3	Requirement		P
	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 the test.	No disassembly, no rupture and no fire, external temperature does not exceed 170 °C	P
<b>38.3.4.6</b>	<b>Test T.6: Impact / Crush</b>		P
38.3.4.6.2	Test procedure – Impact (applicable to cylindrical cells not less than 18 mm in diameter)		P



**TEST REPORT N°: ARED-19AP3591YTSHP**

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	The sample cell or component cell is to be placed on a flat smooth surface. A 15,8 mm ± 0,1mm diameter, at least 6 cm long, or the longest dimension of the cell, whichever is greater, Type 316 stainless steel bar is to be placed across the centre of the sample. A 9,1 kg ± 0,1 kg mass is to be dropped from a height of 61 ± 2,5 cm at the intersection of the bar and sample in a controlled manner using a near frictionless, vertical sliding track or channel with minimal drag on the falling mass. The vertical track or channel used to guide the falling mass shall be oriented 90 degrees from the horizontal supporting surface.	See table 38.3.4.6	P
	The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15,8 mm ± 0,1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact.		P
38.3.4.6.3	Test Procedure – Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18 mm in diameter)		NA
	A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1,5 cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached.		NA
	(a) The applied force reaches 13 kN ± 0,78 kN;		NA
	(b) The voltage of the cell drops by at least 100 mV; or		NA
	(c) The cell is deformed by 50% or more of its original thickness.		NA
	Once the maximum pressure has been obtained, the voltage drops by 100 mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.		NA



**TEST REPORT N°: ARED-19AP3591YTSHP**

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis.		NA
	Each test cell or component cell is to be subjected to one crush only. The test sample shall be observed for a further 6 h. The test shall be conducted using test cells or component cells that have not previously been subjected to other tests.		NA
38.3.4 6.4	Requirement		P
	Cells and component cells meet this requirement if their external temperature does not exceed 170 °C and there is no disassembly and no fire during the test and within six hours after this test.	No disassembly and no fire, external temperature does not exceed 170 °C	P
<b>38.3.4.7</b>	<b>Test T.7: Overcharge</b>		P
38.3.4.7.2	Test procedure		P
	The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows:	See table 38.3.4.7	P
	(a) When the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V.		NA
	(b) When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1,2 times the maximum charge voltage.		P
	Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours.		P
38.3.4.7.3	Requirement		P
	Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.	No disassembly and no fire	P



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**TEST REPORT N°: ARED-19AP3591YTSHP**

UN 38.3

Clause	Requirement + Test	Result - Remark	Verdict
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<b>38.3.4.8</b>	<b>Test T.8: Forced discharge</b>		<b>P</b>
38.3.4.8.2	Test procedure		P
	Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer.	See table 38.3.4.8	P
	The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).		P
38.3.4.8.3	Requirement		P
	Primary or rechargeable cells meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.	No disassembly and no fire	P





**TEST REPORT N°: ARED-19AP3591YTSHP**

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

<b>38.3.4.1</b>	<b>Test T.1: Altitude simulation</b>						<b>P</b>
Sample No.	Before test		After test		Mass loss, (%)	Residual OCV, (%)	Result / Event
	Mass, (g)	OCV, (V)	Mass, (g)	OCV, (V)			
Q46N01	364,72	20,60	364,72	20,57	0	99,85	NL, NV, ND, NR, NF
Q46N02	365,34	20,62	365,30	20,57	0,011	99,76	NL, NV, ND, NR, NF
Q46N03	364,72	20,28	364,72	20,27	0	99,95	NL, NV, ND, NR, NF
Q46N04	364,16	20,51	364,15	20,51	0,003	100	NL, NV, ND, NR, NF
Q46N05	365,41	20,38	365,41	20,38	0	100	NL, NV, ND, NR, NF
Q46N06	365,40	20,20	365,36	20,19	0,011	99,95	NL, NV, ND, NR, NF
Q46N07	365,82	20,19	365,82	20,16	0	99,85	NL, NV, ND, NR, NF
Q46N08	365,53	20,48	365,53	20,42	0	99,71	NL, NV, ND, NR, NF
<b>Supplementary information: Acceptance criteria</b> NL: No Leakage; NV: No Venting; ND: No Disassembly; NR: No Rupture; NF: No Fire							

<b>38.3.4.2</b>	<b>Test T.2: Thermal test</b>						<b>P</b>
Sample No.	Before test		After test		Mass loss, (%)	Residual OCV, (%)	Result / Event
	Mass, (g)	OCV, (V)	Mass, (g)	OCV, (V)			
Q46N01	364,72	20,57	364,55	20,26	0,047	99,49	NL, NV, ND, NR, NF
Q46N02	365,30	20,57	365,12	20,38	0,049	99,08	NL, NV, ND, NR, NF
Q46N03	364,72	20,27	364,50	20,09	0,060	99,11	NL, NV, ND, NR, NF
Q46N04	364,15	20,51	363,92	20,25	0,063	98,73	NL, NV, ND, NR, NF
Q46N05	365,41	20,38	365,24	20,15	0,047	98,87	NL, NV, ND, NR, NF
Q46N06	365,36	20,19	365,18	20,08	0,049	99,46	NL, NV, ND, NR, NF
Q46N07	365,82	20,16	365,62	20,04	0,055	99,40	NL, NV, ND, NR, NF
Q46N08	365,53	20,42	365,31	20,17	0,060	98,78	NL, NV, ND, NR, NF
<b>Supplementary information: Acceptance criteria</b> NL: No Leakage; NV: No Venting; ND: No Disassembly; NR: No Rupture; NF: No Fire							



**TEST REPORT N°: ARED-19AP3591YTSHP**

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

<b>38.3.4.3</b>	<b>Test T.3: Vibration</b>						<b>P</b>
Sample No.	Before test		After test		Mass loss, (%)	Residual OCV, (%)	Result / Event
	Mass, (g)	OCV, (V)	Mass, (g)	OCV, (V)			
Q46N01	364,55	20,26	364,50	20,23	0,014	99,85	NL, NV, ND, NR, NF
Q46N02	365,12	20,38	365,08	20,34	0,011	99,80	NL, NV, ND, NR, NF
Q46N03	364,50	20,09	364,45	20,05	0,014	99,80	NL, NV, ND, NR, NF
Q46N04	363,92	20,25	363,86	20,21	0,016	99,80	NL, NV, ND, NR, NF
Q46N05	365,24	20,15	365,16	20,12	0,022	99,85	NL, NV, ND, NR, NF
Q46N06	365,18	20,08	365,11	20,03	0,019	99,75	NL, NV, ND, NR, NF
Q46N07	365,62	20,04	365,56	19,98	0,016	99,70	NL, NV, ND, NR, NF
Q46N08	365,31	20,17	365,24	20,11	0,019	99,70	NL, NV, ND, NR, NF
<b>Supplementary information: Acceptance criteria</b> NL: No Leakage; NV: No Venting; ND: No Disassembly; NR: No Rupture; NF: No Fire							

<b>38.3.4.4</b>	<b>Test T.4: Shock</b>						<b>P</b>
Sample No.	Before test		After test		Mass loss, (%)	Residual OCV, (%)	Result / Event
	Mass, (g)	OCV, (V)	Mass, (g)	OCV, (V)			
Q46N01	364,50	20,23	364,46	20,19	0,011	99,80	NL, NV, ND, NR, NF
Q46N02	365,08	20,34	365,03	20,30	0,014	99,80	NL, NV, ND, NR, NF
Q46N03	364,45	20,05	364,39	20,02	0,016	99,85	NL, NV, ND, NR, NF
Q46N04	363,86	20,21	363,81	20,16	0,014	99,75	NL, NV, ND, NR, NF
Q46N05	365,16	20,12	365,10	20,07	0,016	99,75	NL, NV, ND, NR, NF
Q46N06	365,11	20,03	365,07	20,01	0,011	99,90	NL, NV, ND, NR, NF
Q46N07	365,56	19,98	365,49	19,95	0,019	99,85	NL, NV, ND, NR, NF
Q46N08	365,24	20,11	365,18	20,06	0,016	99,75	NL, NV, ND, NR, NF
<b>Supplementary information: Acceptance criteria</b> NL: No Leakage; NV: No Venting; ND: No Disassembly; NR: No Rupture; NF: No Fire							



**TEST REPORT N°: ARED-19AP3591YTSHP**

UN 38.3

Clause	Requirement + Test	Result - Remark	Verdict
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38.3.4.5 Test T.5: External short circuit					P
Sample No.:	Ambient, (°C)	OCV at start of test, (V)	Resistance of circuit, (Ω)	Max. External Temperature, (°C)	Result / Event
Q46N01	55,0	20,19	0.076	-	Not exceed 170°C, ND, NR, NF
Q46N02	55,0	20,30	0.081	-	Not exceed 170°C, ND, NR, NF
Q46N03	55,0	20,02	0.076	-	Not exceed 170°C, ND, NR, NF
Q46N04	55,0	20,16	0.082	-	Not exceed 170°C, ND, NR, NF
Q46N05	55,0	20,07	0.076	-	Not exceed 170°C, ND, NR, NF
Q46N06	55,0	20,01	0.081	-	Not exceed 170°C, ND, NR, NF
Q46N07	55,0	19,95	0.076	-	Not exceed 170°C, ND, NR, NF
Q46N08	55,0	20,06	0.082	-	Not exceed 170°C, ND, NR, NF

**Supplementary information: Acceptance criteria**

Not exceed 170°C; ND: No Disassembly; NR: No Rupture; NF: No Fire

Note: The protective device of batteries was operated during the test.



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TEST REPORT N°: ARED-19AP3591YTSHP

UN 38.3

Clause	Requirement + Test	Result - Remark	Verdict
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38.3.4.6 Test T.6: Impact (Cell)				P
Sample No.:	Ambient, (°C)	Observed duration, (h)	Max. External Temperature, (°C)	Result / Event
Q46N09	20.2	6	20.2	Not exceed 170°C, ND, NR, NF
Q46N10	20.2	6	20.2	Not exceed 170°C, ND, NR, NF
Q46N11	20.2	6	20.2	Not exceed 170°C, ND, NR, NF
Q46N12	20.2	6	20.2	Not exceed 170°C, ND, NR, NF
Q46N13	20.2	6	20.2	Not exceed 170°C, ND, NR, NF
Q46N14	20.2	6	20.2	Not exceed 170°C, ND, NR, NF
Q46N15	20.2	6	20.2	Not exceed 170°C, ND, NR, NF
Q46N16	20.2	6	20.2	Not exceed 170°C, ND, NR, NF
Q46N17	20.2	6	20.2	Not exceed 170°C, ND, NR, NF
Q46N18	20.2	6	20.2	Not exceed 170°C, ND, NR, NF

**Supplementary information: Acceptance criteria**

Not exceed 170°C; ND: No Disassembly; NR: No Rupture; NF: No Fire

38.3.4.6 Test T.6: Crush (Cell)				NA
Sample No.:	Ambient, (°C)	OCV at start of test, (V)	Max. External Temperature, (°C)	Result / Event
-	-	-	-	-

**Supplementary information: Acceptance criteria**

Not exceed 170°C; ND: No Disassembly; NR: No Rupture; NF: No Fire



**TEST REPORT N°: ARED-19AP3591YTSHP**

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

<b>38.3.4.7 Test T.7: Overcharge</b>					<b>P</b>
Sample No.:	Ambient, (°C)	Charge current, (A)	Max. voltage of the test, (V)	Test duration, (h)	Result / Event
Q46N19	20,2	8	25,2	24	ND, NF
Q46N20	20,2	8	25,2	24	ND, NF
Q46N21	20,2	8	25,2	24	ND, NF
Q46N22	20,2	8	25,2	24	ND, NF
Q46N23	20,2	8	25,2	24	ND, NF
Q46N24	20,2	8	25,2	24	ND, NF
Q46N25	20,2	8	25,2	24	ND, NF
Q46N26	20,2	8	25,2	24	ND, NF

**Supplementary information: Acceptance criteria**

ND: No Disassembly; NF: No Fire

<b>38.3.4.8 Test T.8: Forced discharge</b>				<b>P</b>
Sample No.:	Result / Event	Sample No.:	Result / Event	
Q46N27	ND, NF	Q46N37	ND, NF	
Q46N28	ND, NF	Q46N38	ND, NF	
Q46N29	ND, NF	Q46N39	ND, NF	
Q46N30	ND, NF	Q46N40	ND, NF	
Q46N31	ND, NF	Q46N41	ND, NF	
Q46N32	ND, NF	Q46N42	ND, NF	
Q46N33	ND, NF	Q46N43	ND, NF	
Q46N34	ND, NF	Q46N44	ND, NF	
Q46N35	ND, NF	Q46N45	ND, NF	
Q46N36	ND, NF	Q46N46	ND, NF	

**Supplementary information: Acceptance criteria**

ND: No Disassembly; NF: No Fire