U.S. JACLEAN, INC.
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Safety Date Sheets for Tapping Pro Cordless (USJ-884)

Specification For lithium-ion Cell

Battery Type: GLE 18650 1800mAh

1. Preface: This product specification describes the technique requirements, test procedure and precaution notes of cylindrical type Lithium-ion Rechargeable cell to be supplied to customer by GLE

2. Description:

2.1 Product: Lithium-ion Rechargeable cell
2.2 Model (Type): ICR18650
2.3 Designation: ICR ——— 18 650
2.3.1: Indicates the performance of cell
The letters "ICR" define Lithium-ion Rechargeable cell of LiCoxNiyMn(1－x－y） O2 series cathode.
2.3.2: Indicates the diameter of cell
18 = 18 mm
2.3.3: Indicates the overall height of cell
650 = 65 mm

3. Cell Size

For details, please refer to Figure A.

Item	Description	Dimensions
H	Height （Bare Cell）	65.0 mm max
D	Diameter （ Bare Cell）	18.4 mm max

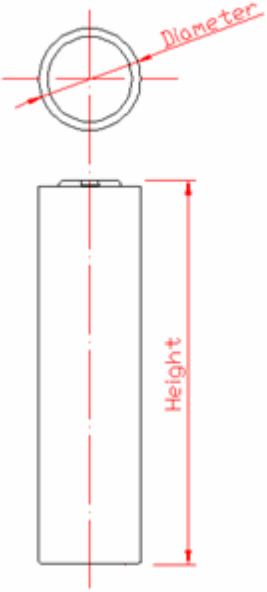

Figure A

4. Cell Construction

A cell is made of cathode, anode, separator, can and cap.

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5. Specification

Item		Specification		Remark
5.1 Typical capacity		1800mAh		0.2C rate discharge capacity
5.2 Minimum capacity		1800mAh		
5.3 Internal impedance		≤60mΩ		By 1kHz AC
5.4 Nominal voltage		3.7V		
5.5 Cell weight		45g±2g		
5.8 Standard discharge conditions （1C）	Constant current	360 mA		
	End-of-charge voltage	2.75V		
5.6 Standard charge method	Constant current	900mA		
	Charge voltage	4.2V±0.05V		
	Cut-off current	25 mA		
5.7 Max charge method	Constant current	1800mA		
	Charge voltage	4.2V±0.05V		
	Cut-off current	25 mA		
5.9 Max continuous discharge current		1A		
5.10 Pulse discharge at 10 Sec		2A		
5.11 Cycle life		over 300 cycles		1C continual discharge (100% DOD)
5.12 Operating temperature	Charging ambient temperature	0～45℃		Cell skin temperature should not exceed 65℃.
	Discharging ambient temperature	-20～45℃		Cell skin temperature should not exceed 80℃
	Storage temperature	1 year	0～30℃	Note: If the cell is kept as ex-factory status (50% of charge)
		3 months	-20～35℃	
		1 month	-20～45℃	
5.13 Appearance		Without break, scratch, distortion, contamination, leakage.		

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6. Test conditions

6.1 Standard test conditions

Unless otherwise specified, all tests stated in this Product Specification are conducted at temperature 23±2℃ and humidity 65 ± 10 %RH.

7. Electrical Characteristics

Test Item	测试方法/ **Test Method**	检验标准/ **Criteria**
7.1 1C Discharge performance (1C)	A cell is charged using standard charge method (spec. 5.6), stored at 23℃±2℃ for 0.5h, and then 1C constant current discharged to 2.75V.	the discharging time is not less than 1h.
7.2 10C Discharge performance (10C)	A cell is charged using standard charge method (spec. 5.6), stored at 23℃±2℃ for 0.5h, and then 10C constant current discharged to 2.75V.	the discharging time is not less than 5min.
7.3 High temperature performance	A cell is charged using standard charge method (spec. 5.6), stored at 55℃±2℃ for 2h, then 1C constant current discharged to 2.75V. After that, fetch out the cell and place it in the ambient temperature of 20℃±5℃ for 2h, then check its appearance.	1. the discharging time is not less than 51min; 2. no distortion, no rupture.
7.4 Low temperature performance	A cell is charged using standard charge method (spec. 5.6), stored at -20℃±2℃for 16h～24h,then discharged to 2.75V at a constant current of 0.2C.After that, fetch out the cell and place it in the ambient temperature of 20℃±5℃ for 2h, then check its appearance.	1.the discharging time is not less than 3h; 2.no distortion, no rupture
7.5 Charge(Capacity) retention	A cell is charged using standard charge method (spec. 5.6), and stored at 20℃±5℃ for 28days, then discharged to 2.75V at a constant current of 0.2C.	Capacity retention:85%Ch
7.6 Cycle life	A cell is charged using standard charge method (spec. 5.6),and stored for 0.5h～1h,then discharged to cut-off voltage, after that, stored 0.5h～1h prior to next charge-discharge cycle. The cell shall be continuously charged and discharged for 300 times.	Capacity retention≥75%

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8. Environment Characteristics

Test item	Test method	Criteria
8.1 Constant temperature and humidity	A cell is charged using standard charge method (spec. 5.6) and stored at 40℃±2℃(90～95%RH) for 48h, then placed in room temperature for 2h. After that, check its appearance prior to being discharged to cut-off voltage at a constant current of 1C.	1. No distortion, no rust, no fume, no explosion. 2. The discharging time is not less than 36min.
8.2 Vibration test	A cell is charged using standard charge method (spec. 5.6), then installed onto the vibration desk with clamps. Equipment parameters of frequency and amplitude are as follows (the frequency is to be varied at the rate of 1oct/min between 10 and 55 Hz and repeat vibration for 30min.The cell is to be tested in three mutually perpendicular directions): frequency:10Hz~30Hz amplitude: 0.38mm frequency: 30Hz~55Hz amplitude: 0.19mm	1. No scratch, no leakage, no fume, no explosion. 2. The min voltage is 3.6V.
8.3 Shock test	A cell is charged using standard charge method (spec. 5.6), then secured to the testing machine by means of rigid mount which supports all mounting surfaces of the cell. Each cell shall be subjected to a total of three shocks of equal magnitude. The shocks are to be applied in each of three mutually perpendicular directions. The acceleration and impulse time are as follows: acceleration of impulse peak value:100m/s2, shock frequency:40~80times/min, impulse lasting time:16min, shock times:1000±10	1. No scratch, no leakage, no fume, no explosion. 2. The min voltage is 3.6V.
8.4 Drop test	A cell is charged using standard charge method (spec. 5.6), then dropped from a height of 1000mm to a wooden board (18-20mm thick) which is placed on the concrete ground. Cells shall be dropped in each of three mutually perpendicular directions. Total drop times are 6. After that, the cell is discharged to cut-off voltage at CC of 1C, then repeat charge & discharge at a current of 1C until the discharge time is not less than 51min, the cycle times should be not more than 3.	No leakage, no fume, no explosion.

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9. Safety test

All below tests are carried out on the equipment's with forced ventilation and explosion-proof device. Before test all cells are charged using standard charge method (spec. 5.6) and stored 24h prior to testing.

Test Item	Test Method	Criteria
9.1 Heating test	A cell is to be heated in a circulating air oven. The temperature of the oven is to be raised at a rate of 5℃±2℃ per minute to a temperature of 130℃±2℃ and remain for 30min at that temperature before the test is discontinued.	No fire, no explosion
9.2 Overcharge test	A cell is discharged to cut-off voltage at CC of 1C.then it is to be subjected to CC/CV power by connecting its positive & negative terminal, then set the current as 3C, the voltage as 10V, after that, Charge the cell up to 10V at CC of 3C, until that last 7h at the voltage of 10V or the voltage is no more increased.	No fire, no explosion
9.3 Short-circuit test	A Cell is to be short-circuited by connecting the positive and negative terminals of the cell with copper wire having a maximum resistance load of 50m.Monitor its temperature while testing, the cell is to be discharged until the cell case temperature has returned to be 10℃ less then peak temperature.	1. No fire, no explosion

10. Shipment

The Cell shall be shipped in voltage range of 3.70 ~ 3.90 V or in accordance with customers' requirement. The remaining capacity before charging shall be changed depending on the storage time and conditions.