TEST REPORT
IEC 60086-4
Primary batteries
Part 4: Safety of lithium batteries

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Applicant's name :	iConn Precision (SZ) Limited
Address :	Unit 101, Block A2, Tianyang 4th Road, Dong Fang Da Tian Yang Industrial Park, Songgang, Bao An, Shenzhen

Test specification:

Standard :	IEC 60086-4:2019
Test procedure :	Test Report
Non-standard test method :	N/A

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Test item description :	Non-Rechargeable Single Use 9V CR123A Battery Pack
Trade Mark :	N/A
Manufacturer :	Ideas Connected Limited
Model/Type reference :	IC-BPL-09CR123A
Ratings :	9.0V, 1.55Ah

No.: MSIYEDTG6126177U5
Code: zfqx3zm6tv

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Pony Testing International Group

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Summary of testing:

Tests performed (name of test and test clause):

☒P ☐F ☐N/A ☐N/R	6.4.1 Test A: Altitude
☒P ☐F ☐N/A ☐N/R	6.4.2 Test B: Thermal cycling
☒P ☐F ☐N/A ☐N/R	6.4.3 Test C: Vibration
☒P ☐F ☐N/A ☐N/R	6.4.4 Test D: Shock
☒P ☐F ☐N/A ☐N/R	6.5.1 Test E: External short-circuit
☐P ☐F ☒N/A ☐N/R	6.5.2 Test F: Impact
☒P ☐F ☐N/A ☐N/R	6.5.3 Test G: Crush
☒P ☐F ☐N/A ☐N/R	6.5.4 Test H: Forced discharge
☒P ☐F ☐N/A ☐N/R	6.5.5 Test I: Abnormal charging
☒P ☐F ☐N/A ☐N/R	6.5.6 Test J: Free fall
☒P ☐F ☐N/A ☐N/R	6.5.7 Test K: Thermal abuse
☐P ☐F ☒N/A ☐N/R	6.5.8 Test L: Incorrect installation
☐P ☐F ☒N/A ☐N/R	6.5.9 Test M: Overdischarge

Possible test case verdicts:

- test object does meet the requirement..... : P(Pass)

- test object does not meet the requirement..... : F(Fail)

- test case does not apply to the test object..... : N/A

- client not requirement.....: N/R

Testing location:

3/F. of Building 2, Building 1, Xinhaosheng Industrial Park, Yonghe Road, Qiaotou Community, Baoan District, Shenzhen, Guangdong, China

Testing.....:

Date of receipt of test item .....: 2024-06-03

Date (s) of performance of tests .....: 2024-06-03 to 2024-06-23

Copy of marking plate



Test item particulars ..... :	
Classification of installation and use ..... :	To be defined in final product
Supply Connection ..... :	DC Connector
Weight of Cell ..... :	N/A
Weight of Battery ..... :	Approx. 55.40g

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.

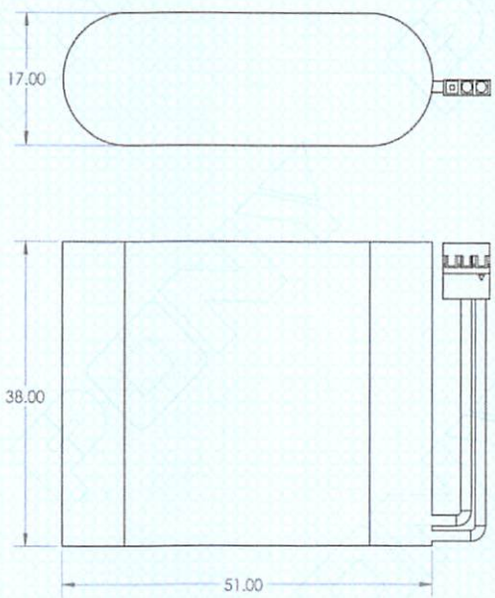
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Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

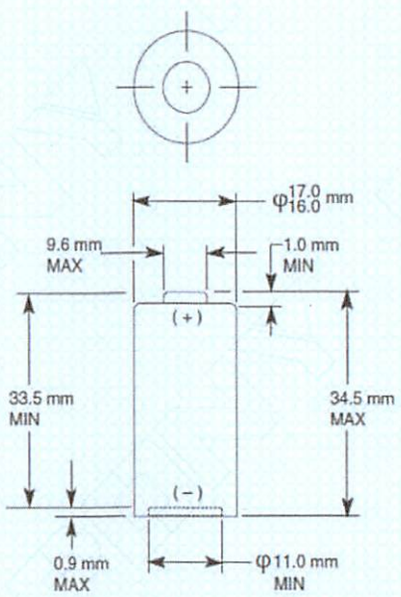
General product information and other remarks:

Product	Cell	Battery
Model/type	CR123A	IC-BPL-09CR123A
Nominal voltage	3.0V	9.0V
Rated capacity	1.55Ah	1.55Ah
Nominal discharge Current	0.12A	0.12A
Maximum discharge Current	0.2A	0.2A
Discharge Cut-off Voltage	1.8V	5.4V
Operating temperature	-20°C~75°C	-20°C~60°C
Shape	Cylindrical	Prismatic

Construction (mm):



Battery



Cell

IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict
4	**REQUIREMENTS FOR SAFETY**		P
4.1	**Design**		P
	a) Abnormal temperature rise above the critical value prevented		P
	b) Temperature increases in the battery controlled		P
	c) Lithium cells and batteries designed to relieve excessive internal pressure or to preclude a violent rupture under conditions of transport, intended use and reasonably foreseeable misuse		P
4.2	**Quality plan**		P
	Manufacturer prepared and implemented a quality plan defining the procedures for the inspection of materials, components, cells and batteries during the course of manufacture, to be applied to the total process of producing a specific type of battery		P
	Manufactures understood their process capabilities and instituted the necessary process controls as they relate to product safety		P
5	**TYPE TESTING AND SAMPLING**		P
5.1	**Validity of testing**		P
5.2	**Test samples**		P
6	**TESTING AND REQUIREMENTS**		P
6.1	**General**		P
6.1.1	Test application matrix		P
	s: cell or single cell battery .....:		N/A
	m: multi cell battery .....:	3S1P	P
6.1.3	Ambient temperature (°C).....:	20°C±5°C	P
6.1.4	Parameter measurement tolerances		P
6.1.5	Predischarge		P
6.1.6	Additional cells		N/A
6.2	**Evaluation of test criteria**		P
6.2.1	Short-circuit		P
6.2.2	Excessive temperature rise		P
6.2.3	Leakage		P
6.2.4	Venting		P
6.2.5	Fire		P
6.2.6	Rupture		P

IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict
6.2.7	Explosion		P
6.3	**Tests and requirements – Overview**		P
6.4	**Tests for intended use**		P
6.4.1	Test A: Altitude .....:	(See appended table 6.4.1)	P
6.4.2	Test B: Thermal cycling .....:	(See appended table 6.4.2)	P
6.4.3	Test C: Vibration .....:	(See appended table 6.4.3)	P
6.4.4	Test D: Shock .....:	(See appended table 6.4.4)	P
6.5	**Tests for reasonably foreseeable misuse**		P
6.5.1	Test E: External short-circuit .....:	(See appended table 6.5.1)	P
6.5.2	Test F: Impact .....:		N/A
6.5.3	Test G: Crush .....:	(See appended table 6.5.3)	P
6.5.4	Test H: Forced discharge .....:	(See appended table 6.5.4)	P
6.5.5	Test I: Abnormal charging .....:	(See appended table 6.5.5)	P
6.5.6	Test J: Free fall .....:	(See appended table 6.5.6)	P
6.5.7	Test K: Thermal abuse .....:	(See appended table 6.5.7)	P
6.5.8	Test L: Incorrect installation .....:		N/A
6.5.9	Test M: Overdischarge .....:		N/A
6.6	**Information given in the relevant specification**		P
	a) Predischarge current or resistive load and end-point voltage specified by the manufacturer.....:	(See appended table 6.1.5)	P
	b) Method to measure the energy of an explosion, if any .....:		N/A
	c) Shape: prismatic, flexible, coin or cylindrical Diameter: less than 18 mm or not less than 18 mm .....:	Shape: Prismatic	P
	d) Maximum continuous discharge current specified by the manufacturer for test H.....:	200mA	P
	e) Rated capacity specified by the manufacturer for test H.....:	1.55Ah	P
	f) Abnormal charging current declared by the manufacturer for test I .....:	10mA	P
	g) Normal reverse current declared by the manufacturer which applied to the battery during its operating life.....:		N/A
7	**INFORMATION FOR SAFETY**		P
7.1	**Safety precautions during design of equipment**		N/A
7.1.1	General		N/A
7.1.2	Charge protection		N/A

IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict
7.1.3	Parallel connection		N/A
7.2	**Precautions during handling of batteries**		N/A
7.3	**Packaging**		N/A
7.4	**Handling of battery cartons**		N/A
7.5	**Transport**		N/A
7.5.1	General		N/A
7.5.2	Air transport		N/A
7.5.3	Sea transport		N/A
7.5.4	Land transport		N/A
7.6	**Display and storage**		P
7.7	**Disposal**		P
8	INSTRUCTIONS FOR USE		P
9	MARKING AND PACKAGING		P
9.1	**General**		P
9.2	**Swallowable batteries**		N/A
9.3	**Safety pictograms**		N/A
ANNEX A	(INFORMATIVE) GUIDELINES FOR THE ACHIEVEMENT OF SAFETY OF LITHIUM BATTERIES		N/A
ANNEX B	(INFORMATIVE) GUIDELINES FOR DESIGNERS OF EQUIPMENT USING LITHIUM BATTERIES		N/A
ANNEX C	(INFORMATIVE) ADDITIONAL INFORMATION ON DISPLAY AND STORAGE		N/A
ANNEX D	(INFORMATIVE) SAFETY PICTOGRAMS		N/A
D.1	**General**		N/A
D.2	**Pictograms**		N/A
D.3	**Instruction for use**		N/A
ANNEX E	(NORMATIVE) CHILD RESISTANT PACKAGING OF COIN CELLS		N/A
E.1	**General**		N/A
E.2	**Applicability**		N/A
E.3	**Packaging tests**		N/A
E.3.1	General		N/A
E.3.2	Test items		N/A
E.3.3	Test procedure		N/A
E.3.4	Criteria		N/A

IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX F	**(INFORMATIVE) USE OF THE KEEP OUT OF REACH OF CHILDREN SAFETY SIGN**		N/A
F.1	**General**		N/A
F.2	**Safety sign**		N/A
F.3	**Best practices for marking the packaging**		N/A
F.4	**Best practices for marking the cell**		N/A

	TABLE: Critical components information				P
Object / part No.	**Manufacturer / trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Cell	Duracell US Operation Inc	CR123A	3.0V, 1.55Ah	IEC 60086-4: 2019	Tested with appliance
Connector	Harwin Connector	M22-3010300	2.00mm Pitch SIL Female Crimp Housing, 3 contacts	--	--
Lead wires	Hong Xing Technology Co., Ltd.	1007	22AWG, 300V, 80°C	--	--

6.1.5	TABLE: Predischarge			P
Sample no.	Ambient T (°C)	Discharge current (mA)	Discharge load (KΩ)	Final voltage (Vdc)
B5-B8	23.3	120	/	1.8
C5-C10	23.3	120	/	5.4

6.4.1	TABLE: Test A: Altitude						P
Sample no.	Before test		After test		OCV loss (%)	Mass loss (%)	Results
	OCV (Vdc)	Mass (g)	OCV (Vdc)	Mass (g)			
B1	9.70	55.454	9.70	55.450	0.000	0.007	P
B2	9.72	55.275	9.72	55.271	0.000	0.007	P
B3	9.72	55.414	9.72	55.411	0.000	0.005	P
B4	9.68	55.295	9.68	55.292	0.000	0.005	P
B5	8.56	55.942	8.56	55.938	0.000	0.007	P
B6	8.55	55.607	8.55	55.603	0.000	0.007	P
B7	8.56	55.383	8.56	55.379	0.000	0.007	P
B8	8.57	55.216	8.57	55.214	0.000	0.004	P
Supplementary information: No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.							

6.4.2	TABLE: Test B: Thermal cycling						P
Sample no.	Before test		After test		OCV loss (%)	Mass loss (%)	Results
	OCV (Vdc)	Mass (g)	OCV (Vdc)	Mass (g)			
B1	9.70	55.450	9.67	55.419	0.309	0.056	P
B2	9.72	55.271	9.69	55.256	0.309	0.027	P
B3	9.72	55.411	9.70	55.402	0.206	0.016	P
B4	9.68	55.292	9.67	55.263	0.103	0.052	P
B5	8.56	55.938	8.54	55.921	0.234	0.030	P
B6	8.55	55.603	8.54	55.594	0.117	0.016	P
B7	8.56	55.379	8.55	55.367	0.117	0.022	P
B8	8.57	55.214	8.56	55.203	0.117	0.020	P
Supplementary information: - No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.							

6.4.3	TABLE: Test C: Vibration						P
Sample no.	Before test		After test		OCV loss (%)	Mass loss (%)	Results
	OCV (Vdc)	Mass (g)	OCV (Vdc)	Mass (g)			
B1	9.67	55.419	9.66	55.419	0.103	0.000	P
B2	9.69	55.256	9.69	55.253	0.000	0.005	P
B3	9.70	55.402	9.70	55.402	0.000	0.000	P
B4	9.67	55.263	9.66	55.262	0.103	0.002	P
B5	8.54	55.921	8.53	55.921	0.117	0.000	P
B6	8.54	55.594	8.54	55.594	0.000	0.000	P
B7	8.55	55.367	8.55	55.364	0.000	0.005	P
B8	8.56	55.203	8.55	55.203	0.117	0.000	P
Supplementary information: - No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.							

6.4.4	TABLE: Test D: Shock						P
Sample no.	Before test		After test		OCV loss (%)	Mass loss (%)	Results
	OCV (Vdc)	Mass (g)	OCV (Vdc)	Mass (g)			
B1	9.66	55.419	9.66	55.416	0.000	0.005	P
B2	9.69	55.253	9.68	55.251	0.103	0.004	P
B3	9.70	55.402	9.70	55.402	0.000	0.000	P
B4	9.66	55.262	9.66	55.262	0.000	0.000	P
B5	8.53	55.921	8.53	55.921	0.000	0.000	P
B6	8.54	55.594	8.54	55.592	0.000	0.004	P
B7	8.55	55.364	8.55	55.364	0.000	0.000	P
B8	8.55	55.203	8.54	55.203	0.117	0.000	P
Supplementary information: - No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.							

6.5.1	TABLE: Test E: External short-circuit				P
Sample no.	OCV before test (Vdc)	Ambient T (°C)	Resistance of circuit (mΩ)	Maximum case temperature (°C)	Results
B1	9.66	23.7	81.6	71.3	P
B2	9.68	23.7	80.3	69.7	P
B3	9.70	23.7	79..5	70.6	P
B4	9.66	23.7	81.2	71.0	P
B5	8.53	23.7	80.1	63.0	P
B6	8.54	23.7	81.5	62.8	P
B7	8.55	23.7	81.6	64.1	P
B8	8.54	23.7	80.5	63.6	P

Supplementary information:

- No excessive temperature rise (>170°C), no rupture, no explosion and no fire during this test and within the 6h of observation.

6.5.3	TABLE: Test G: Crush		P
Sample no.	**OCV before test (Vdc)**	**Maximum case temperature (°C)**	**Results**
C1	3.243	67.8	P
C2	3.240	61.9	P
C3	3.236	67.1	P
C4	3.238	69.4	P
C5	3.237	63.7	P
C6	2.863	32.5	P
C7	2.852	35.1	P
C8	2.865	33.7	P
C9	2.861	34.6	P
C10	2.867	33.9	P
Supplementary information: - No excessive temperature rise (>170°C), no explosion and no fire during this test and within the 6h of observation.			

6.5.4	TABLE: Test H: Forced discharge			P
Sample no.	**OCV before test (Vdc)**	**Initial current (mA)**	**Test duration (h)**	**Results**
C11	2.850	200	7.75	P
C12	2.864	200	7.75	P
C13	2.847	200	7.75	P
C14	2.859	200	7.75	P
C15	2.866	200	7.75	P
C16	2.861	200	7.75	P
C17	2.870	200	7.75	P
C18	2.856	200	7.75	P
C19	2.868	200	7.75	P
C20	2.863	200	7.75	P
Supplementary information: - No explosion and no fire during this test and within 7 days after the test.				

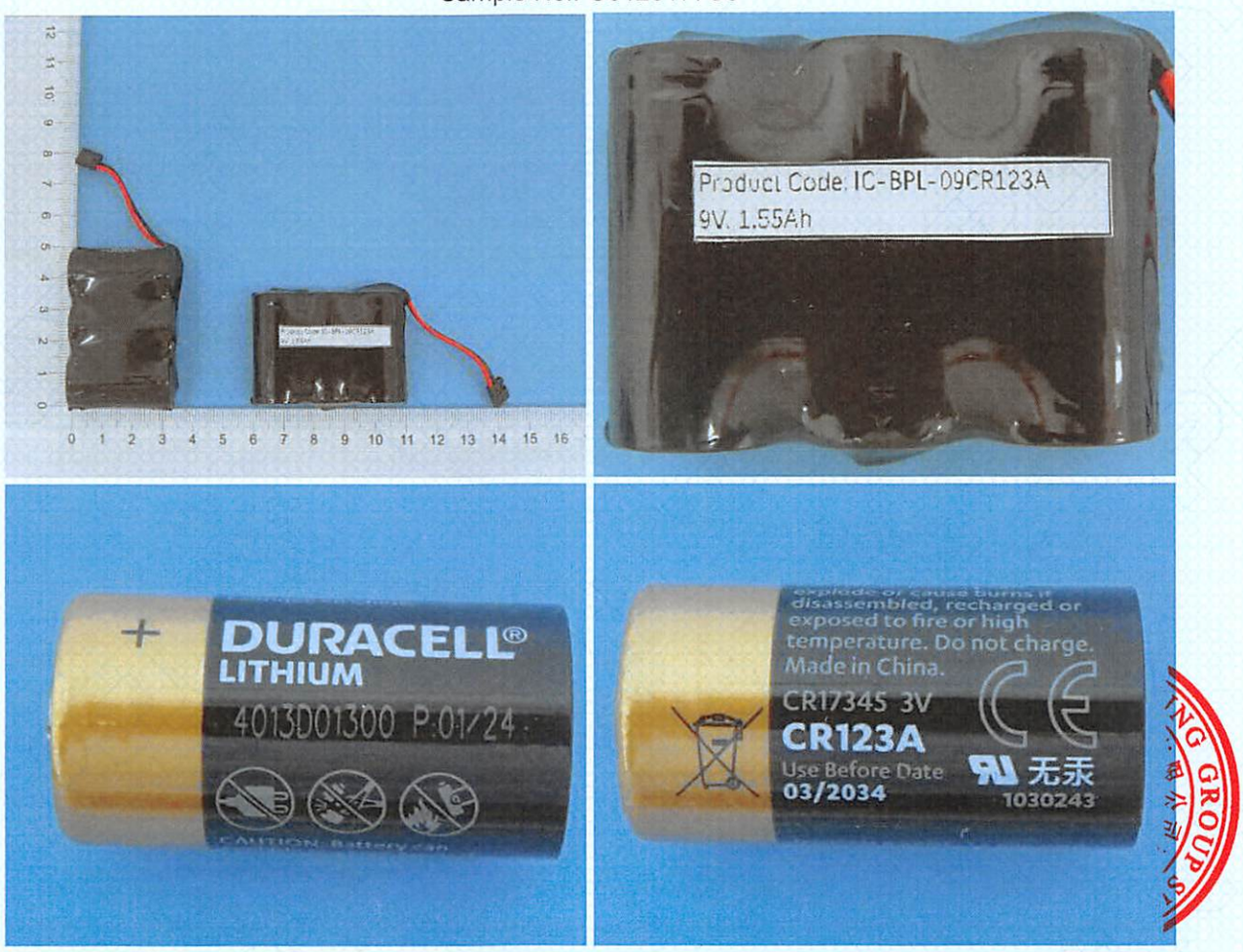
6.5.5	TABLE: Test I: Abnormal charging			P
Sample no.	OCV before test (Vdc)	Charge current (mA)	Test duration (h)	Results
B9	9.72	10	129.2	P
B10	9.73	10	129.2	P
B11	9.75	10	129.2	P
B12	9.73	10	129.2	P
B13	9.72	10	129.2	P
Supplementary information: - No explosion and no fire.				

6.5.6	TABLE: Test J: Free fall			P
Sample no.	OCV before test (Vdc)	Free fall height (m)	OCV after test (Vdc)	Results
B14	9.76	1	9.72	P
B15	9.75	1	9.74	P
B16	9.75	1	9.75	P
B17	9.75	1	9.75	P
B18	9.74	1	9.74	P
Supplementary information: - No venting, no explosion and no fire during this test and within the 1h of observation.				

6.5.7	TABLE: Test K: Thermal abuse		P
Sample no.	OCV before test (Vdc)	Oven temperature (°C)	Results
B19	9.73	130	P
B20	9.73	130	P
B21	9.74	130	P
B22	9.75	130	P
B23	9.74	130	P
Supplementary information: - No explosion and no fire.			

Photo of the sample

Sample No.: G6126177U5



*** End of report ***