




## IECEx TEST REPORT COVER


ExTR Reference Number.....:	NO/PRE/ExTR20.0043/00	
ExTR Free Reference Number .....	PRJN-181579-2020-PA-NOR	
Compiled by + signature (ExTL) .....	Gunnar Nielsen	<i>Gunnar Nielsen</i>
Reviewed by + signature (ExTL).....	Stig André Norheim	<i>Stig André Norheim</i>
Approved by + signature (ExCB) ....	Asle Kaastad	<i>Asle Kaastad</i>
Date of issue .....	2020.03.30	
Ex Testing Laboratory (ExTL).....:		
Address .....	DNV GL Presafe AS Veritasveien 3 1363 Høvik Norway	
Ex Certification Body (ExCB) .....	N / A	
Address .....	N / A	
Applicant's name.....	RIKEN KEIKI Co., Ltd.	
Address .....	2-7-6, Azusawa, Itabashi-Ku, Tokyo, 174-8744, Japan	
Standards associated with this ExTR package .....	IEC 60079-0: 2017 ed. 7 IEC 60079-11: 2011 ed. 6	
Clauses considered .....	IEC 60079-0, clause 23.3 IEC 60079-11, clause 10.5	
Test Report Form Number .....	ExTR Cover_7 (released 2018-02)	
Related Amendments, Corrigenda or ISHs .....	N / A	
Test item description .....	Battery (secondary cell)	
Model/type reference .....	Panasonic NCR18650GA	
Code (e.g. Ex __ II__ T__ ).....	N / A	
Rating .....	Battery maximum open circuit voltage: 4,2V	

### ExTR Package Contents

Assembled ExTR documents and Additional reference material:

[IECEx Test Report Cover](#)

[IECEx Partial Testing Report](#)

Manufacturer's name .....	RIKEN KEIKI Co., Ltd.
Address .....	2-7-6, Azusawa, Itabashi-Ku, Tokyo, 174-8744, Japan
Trademark .....	
Certificate No. (optional) .....	N / A
QAR Reference No. (optional) .....	NO/PRE/QAR19.0018/00
<b>Particulars: Test item vs. Test requirements</b>	
Classification of installation and use .....	N / A
Ingress protection .....	N / A
Rated ambient temperature range (°C).....	+60°C
<b>General remarks:</b>	
<p>The test results presented in this ExTR package relate only to the item or product tested.</p> <ul style="list-style-type: none"> <li>▪ "(See Attachment #)" refers to additional information appended to the ExTR package.</li> <li>▪ "(See appended table)" refers to a table appended to the ExTR package.</li> <li>▪ Throughout this ExTR package, a point is used as the decimal separator.</li> <li>▪ <i>Where the term "N/A" appears in any part of an ExTR package, it indicates that the associated issue was considered "Not applicable" to the involved evaluation.</i></li> <li>▪ <i>In accordance with IECEx 02, a Receiving ExCB may request a sample of the Ex equipment and copies of the documentation referred to in an ExTR Cover.</i></li> </ul> <p>The technical content of this ExTR package shall not be reproduced except in full without the written approval of the Issuing ExCB and ExTL.</p>	
<b>General product information:</b>	
<a href="#">Batteries are tested in heat chamber upon applicant's request.</a>	
<b>Copy of Marking Plate:</b>	
N / A	
<b>Details regarding 'trade agent' / 'local assembler' application in accordance with OD 203:</b>	
N / A	
<b>Testing not fully performed by ExTL staff at the above ExTL address:</b>	
N / A	
<b>National differences considered as part of this evaluation:</b>	
N / A	
<b>"Specific Conditions of Use" / "Schedule of Limitations":</b>	
N / A	
<b>Routine tests:</b>	
N / A	
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Technical Documents			
Title:	Drawing No.:	Rev. Level:	Date:
<a href="#">N / A</a>	<a href="#">N / A</a>	<a href="#">N / A</a>	<a href="#">N / A</a>

Note: An \* is included before the title of documents that are new or revised.



## IECEx TEST REPORT of PARTIAL TESTING

ExTR Reference Number.....: NO/PRE/ExTR20.0043/00  
ExTR Free Reference Number .....: PRJN-181579-2020-PA-NOR  
Compiled by + signature (ExTL) .....: Gunnar Nielsen  
Reviewed by + signature (ExTL).....: Stig André Norheim  
Date of issue .....: 2020.03.30

*Gunnar Nielsen*  
*Stig André Norheim*

Ex Testing Laboratory (ExTL).....:



Address.....: DNV GL Presafe AS  
Veritasveien 3  
1363 Høvik  
Norway

Applicant's name.....: RIKEN KEIKI Co., Ltd.  
Address.....: 2-7-6, Azusawa,  
Itabashi-Ku,  
Tokyo, 174-8744,  
Japan

Standards.....: IEC 60079-0: 2017 ed. 7  
IEC 60079-11: 2011 ed. 6  
Test Report Form Number .....: ExTR Partial Testing\_2 (released 2018-02)  
Related Amendments, Corrigenda  
or ISHs .....: N / A

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### Possible test case verdicts:

- test case does not apply to the test item .....:N / A
- test item does meet the requirement .....:Pass

### General remarks:

The test results presented in this ExTR of Partial Testing relate only to the item or product tested, and do not represent a complete evaluation and testing of the item or product.

- "(see Attachment #)" refers to additional information appended to this document.
- "(see appended table)" refers to a table appended to this document.
- Throughout this document, a comma is used as the decimal separator.

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IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
23.3	Cell types	According to table 14: Type system: Lithium ion Positive electrode: (NCA) Li(NiCoAl)O <sub>2</sub> Electrolyte: Liquid solution Negative electrode: Carbon Voltage: 3,6V Maximum open circuit voltage: 4,2V	Pass
IEC 60079-11			
Clause	Requirement – Test	Result – Remark	Verdict
10.5	Tests for cells and batteries		
10.5.1	General	The cells were fully charged and discharged twice before charged the third time for testing. Short-circuit link = 2mΩ	Pass
10.5.2	Electrolyte leakage test for cells and batteries	10 cells were subjected to: a) short circuit until discharged Period of time: 19 hours over a piece of blotting paper. Result: No visible signs of leakage on the blotting paper or the cell itself.	Pass
10.5.3	Spark ignition and surface temperature of cells and batteries	The battery consists of only one single cell. 10 cells were subjected to the tests. a) Worst case results: Short circuit current: 170A Internal resistance: 24mΩ b) Tests carried out in a heat chamber upon customer's request. Ambient temperature: 60°C Maximum surface temperature: 103°C (ΔT = 43K) → T4 (The tests were performed without any enclosure upon customer's request.) See measurement section below, for details.	Pass

**Measurement Section, including Additional Narrative Remarks (as deemed applicable)**

Panasonic NCR18650GA:

Spark ignition testing, clause 10.5.3. a:

No.	Open circuit voltage [V]	Resistance of short circuit link [mΩ]	Measured voltage over short circuit link [mV]	Short circuit current (I = U / R) [A]	Internal resistance (R = U / I) [mΩ]
1	4,139	2	300	150	28
2	4,127	2	324	162	25
3	4,127	2	320	160	26
4	4,128	2	334	167	25

5	4,139	2	328	164	25
<b>6</b>	<b>4,137</b>	<b>2</b>	<b>340</b>	<b>170</b>	<b>24</b>
7	4,138	2	320	160	26
8	4,126	2	324	162	25
9	4,143	2	322	161	26
10	4,132	2	324	162	25

Surface temperature testing, clause 10.5.3.b:

No.	Ambient temperature [°C]	Measured temperature [°C]	Delta temperature [K]	Max. ambient temperature [°C]	Temperature class
1	60	89	29	60	T5
<b>2</b>	<b>60</b>	<b>103</b>	<b>43</b>	<b>60</b>	<b>T4</b>
3	60	96	36	60	T5
4	60	89	29	60	T5
5	60	87	27	60	T5
6	60	91	31	60	T5
7	60	93	33	60	T5
8	60	90	30	60	T5
9	60	85	25	60	T5
10	60	89	29	60	T5

NOTE: the temperature tests are done without an enclosure upon customer request.

Electrolyte leakage testing, clause 10.5.2:

The ten test cells are placed over a piece of blotting paper.

Test duration ≥12 hours.

Results:

Maximum short circuit current (if required): 170A

Minimum internal resistance: 24mΩ

Maximum temperature rise: 43K

Visible sign of electrolyte on the blotting paper or on the external surfaces of the test samples: No

Comments:

Discharged with 2,5A, and a cut off voltage of 2,5V.

Rated capacity: 3300mAh