






## TECHNICAL REPORT

<b>Product</b>	Portable Gas Monitor		
<b>Name and address of the applicant</b>	RIKEN KEIKI Co., Ltd. 2-7-6, Azusawa, Itabashi-ku, Tokyo, 174-8744, Japan		
<b>Rating and principal characteristics</b>	Battery operated. BUL-6000/6100 (rechargeable Li-ion battery unit) or BUD-6000/6100 (Alkaline battery unit). For BUD-6000/6100: use only Toshiba LR6 or Duracell MN1500 AA-batteries. Both battery units can be installed into GX-6000 and GX-6100. See description of equipment under test for details.		
<b>Trade mark (If any)</b>			
<b>Model/type</b>	GX-6000 and GX-6100		
<b>DNV certificate no.</b>	Presafe 15 ATEX 6171X issue 7		
<b>Ex-code for component / electrical apparatus</b>	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">      </div> <div> II 1 G Ex ia IIB T4/T3 Ga -20°C ≤ Ta ≤ +50°C  II 1 G Ex ia IIC T4/T3 Ga -20°C ≤ Ta ≤ +50°C  II 1 G Ex da ia IIC T4/T3 Ga -20°C ≤ Ta ≤ +50°C </div> </div>		
<b>Additional information</b>	T <sub>amb</sub> -20°C to +50°C		
<b>Report issue No.</b>	7		
<b>Tested according to</b>	<div style="display: flex; justify-content: space-between;"> <div> EN IEC 60079-0:2018 (IEC 60079-0 ed. 7)   EN 60079-1:2014 (IEC 60079-1 ed. 7)   EN 60079-11:2012 (IEC 60079-11 ed. 6) </div> <div> Explosive atmospheres, Part 0: Equipment – General requirements   Equipment protection by flameproof enclosures “d”   Electrical apparatus for potentially explosive atmospheres  Equipment protection by intrinsic safety “i” </div> </div>		
<b>Name and address of the testing laboratory</b>		<b>DNV Product Assurance AS</b> Veritasveien 1 1363 Høvik Norway	<b>Tel:</b> +47 67 57 88 00 <b>e-mail:</b> <a href="mailto:ex@dnv.com">ex@dnv.com</a> <b>Web:</b> <a href="http://www.dnv.com">www.dnv.com</a>
<b>Prepared by</b>	<div style="border: 1px solid black; height: 30px; width: 100%;"></div> <div style="display: flex; justify-content: space-between;"> <span><b>Gunnar Nielsen</b></span> <span><b>2023-11-27</b></span> </div>		
<b>Reviewed by</b>	<div style="border: 1px solid black; height: 30px; width: 100%;"></div> <div style="display: flex; justify-content: space-between;"> <span>Digital signature</span> <span><b>Date</b></span> </div>		
<b>Approved by</b>	<div style="border: 1px solid black; height: 30px; width: 100%;"></div> <div style="display: flex; justify-content: space-between;"> <span>Digital signature</span> </div>		

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**General remarks:**

The test results presented in this Technical Report relate only to the item or product tested.

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






**Appendix; Part 0 (IECEx TEST REPORT ADDENDUM, IEC 60079-0 and IEC 60079-11)**
**Description of equipment under test:**

This report covers the portable gas monitor GX-6000 and GX-6100, which is used for measuring flammable gas concentration in hazardous location. GX-6000 and GX-6100 are battery-operated handheld portable devices and are built up by anti-electrostatic plastic enclosure with minor metal parts such as assembly screws. Different alternative battery units may be used, BUL-6000/6100 (rechargeable Li-ion battery) and BUD-6000/6100 (alkaline dry battery). All battery units can be used for GX-6000 and GX-6100. Replacement or charging of battery unit can be performed by end-users and is only allowed in non-hazardous areas. Safety instructions and warnings must be followed. Following parts are also included in the investigation, charger module BC-6000 or SDM-6000, Combustible gas sensor, Toxic gas sensor and Oxygen sensor, Smart sensor type DES, ESS, PIS, SHS & OSS.

GX-6000: When the combustible gas sensor is used the gas group is limited to IIB.

GX-6100: Combustible gas sensor, NCR-6309, is used and the gas group is IIC, as sensor is certified as "da".

Ambient temperature range during battery charging:  $-0^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$

GX-6000:			
Ex code	Ambient temperature	Combustible gas sensor	Battery
 II 1 G Ex ia IIB T4 Ga	-20°C to +50°C	Mounted	BUL-6000 / BUL-6100
 II 1 G Ex ia IIC T4 Ga	-20°C to +50°C	Not mounted	BUL-6000 / BUL-6100
 II 1 G Ex ia IIB T4 Ga	-20°C to +50°C	Mounted	BUD-6000 / BUD-6100 LR6 (Toshiba)
 II 1 G Ex ia IIC T4 Ga	-20°C to +50°C	Not mounted	BUD-6000 / BUD-6100 LR6 (Toshiba)
 II 1 G Ex ia IIB T3 Ga	-20°C to +50°C	Mounted	BUD-6000 / BUD-6100 MN1500 (Duracell)
 II 1 G Ex ia IIC T3 Ga	-20°C to +50°C	Not mounted	BUD-6000 / BUD-6100 MN1500 (Duracell)
GX-6100:			
Ex code	Ambient temperature	Combustible gas sensor	Battery
 II 1 G Ex da ia IIC T4 Ga	-20°C to +50°C	Mounted	BUL-6100 / BUL-6000
 II 1 G Ex ia IIC T4 Ga	-20°C to +50°C	Not mounted	BUL-6100 / BUL-6000
 II 1 G Ex da ia IIC T4 Ga	-20°C to +50°C	Mounted	BUD-6100 / BUD-6000 LR6 (Toshiba)
 II 1 G Ex ia IIC T4 Ga	-20°C to +50°C	Not mounted	BUD-6100 / BUD-6000 LR6 (Toshiba)
 II 1 G Ex da ia IIC T3 Ga	-20°C to +50°C	Mounted	BUD-6100 / BUD-6000 MN1500 (Duracell)
 II 1 G Ex ia IIC T3 Ga	-20°C to +50°C	Not mounted	BUD-6100 / BUD-6000 MN1500 (Duracell)

**Electrical Data**

Battery operated. BUL-6000/6100 (rechargeable Li-ion battery unit) or BUD-6000/6100 (Alkaline battery unit)  
For BUD-6000/6100: use only Toshiba LR6 or Duracell MN1500 AA-batteries (different battery types shall not be mixed).

**Degrees of protection (IP Code):** (Compliance with requirement of IP20 is checked)

**Warning markings;**

BUL-6000/6100 (Label B): WARNING – Do not charge battery in haz.loc.

BUD-6000/6100 (Label C): WARNING – Use only battery types LR6 TOSHIBA or MN1500 DURACELLGX-6100, BUL-6000, BUD-6000 (Label D): Read manual for safety info. Do not open in haz.loc.

**Descriptive documents;**

Drawing No.	Name/Title	Rev.	Date	Page/s
E3-6991-5470-70-01K	INDEX GX-6000	9	2023.03.08	1
E3-6991-5470-70-02K	INDEX GX-6100	5	2023.11.22	1
-	Safety Information	9	2023.10.18	3

**Copy of marking plate:**

GX-6000(LABEL A)

MODEL GX-6000  
INST.No.  
RIKEN KEIKI Co., Ltd.  
2-7-6, Azusawa, Itabashi-ku, Tokyo, 174-8744, Japan

☐ :6000 OR  
☐ 6100  
 GX-6000, BUL-☐, BUD-☐ (LABEL D)



GX-6100(LABEL A)

MODEL GX-6100  
INST.No.  
RIKEN KEIKI Co., Ltd.  
2-7-6, Azusawa, Itabashi-ku, Tokyo, 174-8744, Japan

BUL-☐ (LABEL B) ☐ :6000 OR 6100

MODEL BUL-☐  
INST.No.  
RIKEN KEIKI Co., Ltd./2-7-6, Azusawa,  
Itabashi-ku, Tokyo, 174-8744, Japan  
WARNING  
Do not charge battery in haz.loc.


☐ :6000 OR 6100  
 GX-6100, BUL-☐, BUD-☐ (LABEL D)


BUD-☐ (LABEL C) ☐ :6000 OR 6100

MODEL BUD-☐  
INST.No.  
RIKEN KEIKI Co., Ltd./2-7-6, Azusawa,  
Itabashi-ku, Tokyo, 174-8744, Japan  
WARNING Use only battery types  
LR6 TOSHIBA or MN1500 DURACELL

**Tested according to additional information:**

N / A

<b>Other requirements:</b>	
N / A	
<b>Additional information:</b>	
N / A	
<b>Calibration:</b>	All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Further information about traceability will be given on request.
<b>Measurement uncertainty:</b>	Measurement uncertainties are calculated for all instruments and instrument set-ups given in this report. Calculations are based on the principles given in the standard EA-4/02 (Oct 2013). Further information about measurement uncertainties will be given on request
<b>Laboratory accreditation</b>	 Testing laboratory satisfy requirements in NS-EN ISO/IEC 17025
<b>Possible test case verdicts:</b> - test case does not apply to the test item.....: N / A - test item does meet the requirement.....: Pass	

Report History		
Issue No.	Date of revision	Description
0	2015-04-21	Original report
1	2015-06-16	- Changed layout of DES sensor PCB in order to change the optical path length. The infrared sensor is then able to measure additional gas type. - Minor changes of non-safety components charger module SDM-6000.
2	2020-08-27	Update the notified body number
3	2020-11-02	Removed EN60079-26: 2007
4	2021-04-28	Updated to the latest edition of EN 60079-0, include an additional battery cell for use with BUD-6000 and update gas group to IIB when the combustible gas sensor (NC 6264A) is used.
5	2021-08-05	Correct the marking label with new battery cell type.
6	2022-11-02	Added the model GX-6100, new piezo electric buzzer, backup battery changed and new BLE module.
7	2023-11-27	New additional secondary cells for use in BUL-6100.

**Equipment tested:**

DNV Sample ID.	Date received	Description (size, colour, material, prototype modification, version no. etc)	Serial no. (if any)
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1	2023.02.09	GX-6100 – battery testing (returned)	521032-010
2	2023.02.09	GX-6100 – battery testing (returned)	521032-011
3	2023.02.09	GX-6100 – battery testing (returned)	521032-012
4	2023.02.09	GX-6100 – battery testing (returned)	521032-014
5	2023.02.09	GX-6100 – No resin filling	521032-001
6	2023.02.09	GX-6100	521032-009
7	2023.02.09	GX-6100 – battery testing (returned)	521032-013
8	2023.02.09	BC-6000 – battery charger (not a part of EUT)	317060164ID
9	2023.02.09	BC-6000 – battery charger (not a part of EUT)	317060181ID
10	2023.02.09	Tools (Screwdriver and special tool)	N / A
11	2023.05.22	GX-6100 – battery testing	230404-003
12	2023.05.22	GX-6100 – battery testing	230404-004
13	2023.05.22	GX-6100 – battery testing	230404-005
14	2023.06.27	GX-6100 – battery testing	230606-001
15	2023.06.27	GX-6100 – battery testing	230606-002
16	2023.08.10	GX-6100 – battery testing	230606-003
17	2023.10.24	PC LNP STAT-LOY D3000IEU6-4G7B1971 – surface resistance test	N / A
18	2023.10.24	PC LNP STAT-LOY D3000IEU6-4G7B1971 – surface resistance test	N / A
19	2023.10.24	PC LNP STAT-LOY D3000IEU6-4G7B1971 – surface resistance test	N / A
20	2023.10.24	PC LNP STAT-LOY D3000IEU6-4G7B1971 – surface resistance test	N / A
21	2023.10.24	PC LNP STAT-LOY D3000IEU6-4G7B1971 – surface resistance test	N / A
22	2023.10.24	PC LNP STAT-LOY D3000IEU6-4G7B1971 – surface resistance test	N / A
23	2023.10.24	PC LNP STAT-LOY D3000IEU6-4G7B1971 – surface resistance test	N / A
24	2023.10.24	PC LNP STAT-LOY D3000IEU6-4G7B1971 – surface resistance test	N / A

### Photos of equipment






(Cells are encapsulated and not visible.)

EN IEC 60079-0:2018			
Clause	Requirement - Test	Result - Remark	Verdict
<b>Endorsement notice:</b> The text of the International Standard IEC 60079-0:2017 was approved by CENELEC as a European Standard without any modifications Additional information relating to the European ATEX directive 2014/34/EU (informative):			
<b>Annex ZY.1</b>	<b>Equipment groups and categories</b>		
<b>Annex ZY.2</b>	<b>Instructions</b> In clause 30.1 under: "instructions for safety addressing the following areas – installation and erection;" "Information other than the general requirements given in IEC 60079-14" Is replaced by "Information other than the general requirements given in EN 60079-14 and EN 50628"		Pass
<b>Annex ZY.3</b>	<b>Marking</b>	Refer to checklist for MARKING: -ADDITIONAL REQUIREMENTS ACCORDING TO ATEX DIRECTIVE	Pass
<b>Annex ZY.4</b>	<b>Fans</b> Clause 17.2.5 "Room ventilating fans" is to be supplemented by the requirements given in EN 14986 "Design of fans working in potentially explosive atmospheres"	No fans in EUT.	N / A

EN 60079-1:2014			
Clause	Requirement - Test	Result - Remark	
<b>Endorsement notice:</b> The text of the International Standard IEC 60079-1:2014 was approved by CENELEC as a European Standard without any modifications.			

EN 60079-11:2012			
Clause	Requirement - Test	Result - Remark	
<b>Endorsement notice:</b> The text of the International Standard IEC 60079-11:2011 was approved by CENELEC as a European Standard without any modifications.			

MARKING: -ADDITIONAL REQUIREMENTS ACCORDING TO ATEX DIRECTIVE			
Clause	Requirement - Test	Result - Remark	Verdict
	Where reference is made to Directive 2014/34/EU, the marking shall also include (Annex II, 1.0.5)		Pass
	<ul style="list-style-type: none"> <li>name, registered trade name or registered trade mark, and address of the manufacturer,</li> </ul>	RIKEN KEIKI Co., Ltd. 2-7-6, Azusawa, Itabashi-ku, Tokyo, 174-8744, Japan	Pass
	<ul style="list-style-type: none"> <li>the year in which the equipment was constructed</li> </ul>	Small equipment – limited space.	N / A
	<ul style="list-style-type: none"> <li>the specific marking of explosion protection  followed by the symbol of the equipment-group and the category</li> </ul>	 II 1 G	Pass
	<ul style="list-style-type: none"> <li>CE marking with identification number to the notified body involved in the production control phase</li> </ul>	 2460	Pass
	<ul style="list-style-type: none"> <li>If ATEX component, no CE mark, only NB number</li> </ul>	EUT is not an Ex component.	N / A
	for equipment Group II:		Pass
	<ul style="list-style-type: none"> <li>the letter 'G' where explosive atmospheres caused by gases, vapours or mists are concerned and/or</li> </ul>	G	Pass
	<ul style="list-style-type: none"> <li>the letter 'D' where explosive atmospheres caused by dusts are concerned</li> </ul>		N / A