



1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 11ATEX2152X** Issue: **4**

4 Equipment: **Portable combustible and toxic gas detectors
Model PGM62a0x, PGM62a6x and PGM62a8x**

5 Applicant: **Rae Systems Inc** **Rae Systems (Shanghai) Inc**

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Shanghai 201815
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7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2006 EN 60079-11:2007 EN 60079-26:2007
EN 60079-0:2009 (used for guidance in respect of marking)

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

With RAE LEL sensor Ex ia



I M1
Ex ia I Ma
 $T_a = -20^{\circ}\text{C} \leq T_{amb} \leq +50^{\circ}\text{C}$



II 1G
Ex ia IIC T4 Ga
 $T_a = -20^{\circ}\text{C} \leq T_{amb} \leq +50^{\circ}\text{C}$

With Dynament LEL sensor Ex d



I M2
Ex ia d I Mb
 $T_a = -20^{\circ}\text{C} \leq T_{amb} \leq +50^{\circ}\text{C}$



II 2G
Ex ia d IIC T4 Gb
 $T_a = -20^{\circ}\text{C} \leq T_{amb} \leq +50^{\circ}\text{C}$

Project Number 28024

C Ellaby
Deputy Certification Manager

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Sira Certification Service

Rake Lane, Eccleston, Chester, CH4 9JN, England



SCHEDULE

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13 DESCRIPTION OF EQUIPMENT

The Model PGM62xxx is a handheld, battery powered, multiple Gas Detector for the continuous display of toxic or combustible gas concentrations. The Gas Detector is provided either with a pump to bring the air sample to the sensors or provided as a diffusion model (designated with the suffix D.) The Gas Detector is supplied by a rechargeable Battery Pack containing two or three, Li-ion battery cells connected in parallel. The Li-ion Battery Pack has two variations: one with four power outputs rated from 0.80 W to 1.82 W and the other with power outputs rated from 1.16 W to 1.82 W. The Battery Pack is fully encapsulated and contains safety circuits including infallible resistors and five fuses. An alternative Battery Adapter uses four replaceable AA alkaline batteries, Duracell MN1500 type only. The alkaline Battery Adapter also has two variations: one with four outputs rated from 0.78 W to 1.12 W and the other rated from 1.11 to 1.12 W. The alkaline Battery Adapter also contains safety circuits including infallible resistors and fuses. The fuses are encapsulated. Three push buttons facilitate the access to measured levels or alarms, and the mode button makes it possible to change preset limits and setting. Audible and visual alarm indicators are included. The visual alarm comprises a red LED bar visible from the top and the side. Two imbalanced motors produce a vibration alert when in alarm mode.

There are three variations of the Gas Detector with the following variations:

Model	Battery pack wattage	LEL Sensor (zone)	NDIR Sensors
PGM-62a0x	1.2 W	RAE (zone 0)	No
PGM-62a6x	0.8 W	RAE (zone 0)	No
PGM-62a8x	0.8 W	Dynamment (zone 1)	Yes

The types of sensors are LEL (either catalytic bead or NDIR), electrochemical (EC), PID and Gamma. The Gas Detector has five sensor slots to accommodate sensors as follows;

Sensor Type	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5
PID					X
LEL (catalytic bead)	X				
NDIR					X
EC	X	X	X	X	X
Dual EC	X		X		X
Gamma				X	

Note: NDIR includes CO₂, methane LEL and methane VOL sensors

The various variations of the PGM-62a0x, PGM-62a6x and PGM-62a8x reflect sensor combinations that are unique to specific end-use applications as shown in the following table.



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Model no.	Marking	PID	Gamma	RAE LEL	Dynamment NDIR	EC
PGM-62a0x	I M1, Ex ia I Ma II 1G, Ex ia IIC T4 Ga	Optional	Optional	Optional	No	Optional
PGM-62a6x	I M1, Ex ia I Ma II 1G, Ex ia IIC T4 Ga	Optional	Optional	Optional	No	Optional
PGM-62a8x	I M2, Ex ia d I Mb II 2G, Ex ia d IIC T4 Gb	Optional	Optional	Optional	Optional	Optional

Notes: Where a = 0, 2, 4, 6, 8 or 9 to show type
The model no. may contain following suffixes:

- T to denote a unit without any combustibile sensors.
- D to denote a diffusion unit with RAE LEL sensor (PGM-62a0, PGM-62a6 and PGM-62a8) or Dynamment LEL sensor(PGM-62a8)
- TD to denote a diffusion unit without any combustibile sensors.

Variation 1 - This variation introduced the following changes:

- The manufacturing location in China was changed from No. 788 Zhaoxian Road, Jia Ding District, Shanghai 201821 to that currently shown.
- The revision status of drawing number C03-1008-000 was corrected and drawing C03-1113-S00 is removed

Variation 2 - This variation introduced the following changes:

- It was recognised that:
 - the pump model has one buzzer.
 - the diffusion model has one additional buzzer actuated by an associated Diffusion Board.
- An alternative construction of the EC Sensor Board was acknowledged.

Variation 3 - This variation introduced the following changes:

- The products were allowed to be used for mining purposes, additional marking was introduced for these applications, the table showing the model numbers was amended accordingly.

Variation 4 - This variation introduced the following changes:

- The metal panel on the enclosure was allowed to be made to an alternative design.
- The use of alternative O2 Sensors was recognised.
- The equipment may now be used with an alternative battery pack, this has an additional cell (making a total of three cells); the Description of Equipment and Special Conditions For Safe Use were amended accordingly.
- An alternative construction of the Main Board was acknowledged.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

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14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	24 June 2011	R24989A/00	The release of the prime certificate.
1	28 July 2011	R24989B/00	The introduction of Variation 1.
2	08 February 2012	R26601A/00	The introduction of Variation 2.
3	20 March 2012	R26844A/00	The introduction of Variation 3.
4	13 July 2012	R28024A/00	The introduction of Variation 4.

15 SPECIAL CONDITIONS FOR SAFE USE (denoted by X after the certificate number)

- 15.1 The PGM62xxx shall only be fitted with RAE Systems Battery Pack types: M01-3051-000, M01-3053-000, M01-3055-000 or M01-3056-000 or Battery Adapter M01-3052-000 or M01-3054-000 fitted with Duracell MN1500 batteries.
- 15.2 The PGM62xxx shall only be charged outside the hazardous area.
- 15.3 No precautions against electrostatic discharge are necessary for portable equipment that has an enclosure made of plastic, metal or a combination of the two, except where a significant static generating mechanism has been identified. Activities such as placing the item in a pocket or on a belt, operating a keypad or cleaning with a damp cloth, do not present a significant electrostatic risk. However, where a static-generating mechanism is identified, such as repeated brushing against clothing, then suitable precautions shall be taken, e.g. the use of anti-static footwear.

16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

17 CONDITIONS OF CERTIFICATION

- 17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.
- 17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.
- 17.3 The products covered by this certificate incorporate previously certified devices, it is therefore the responsibility of the manufacturer to continually monitor the status of the certification associated with these devices, and the manufacturer shall inform Sira of any modifications of the devices that may impinge upon the explosion safety design of their products.

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Certificate Annexe



Certificate Number: Sira 11ATEX2152X
 Equipment: Portable combustible and toxic gas detectors
 Model PGM62a0x, PGM62a6x, and PGM62a8x
 Applicant: Rae Systems Inc.

Issue 0

Drawing No.	Sheets	Rev.	Date (Sira Stamp)	Title
310-0131-000-SCH	1 of 1	3	21 Jun 11	FSTN LCD Protection Board
904-E300-011.05	1 of 1	1	21 Jun 11	PGM62XX Internal Wiring List
C03-0903-ASY-CSA	1 of 1	1	21 Jun 11	4R+EC, Sensor Module [Schedule]
C03-0910-ASY	1 of 1	3	21 Jun 11	Gamma Sensor, 4R+, Sensor Module
C03-0911-ASY-CSA	1 of 1	3	21 Jun 11	LEL Sensor, 4R+, Sensor Module
C03-0913-ASY	1 of 1	2	21 Jun 11	Dual Gas EC Sensor, 4R+, Sensor Module, H2S/CO
C03-1002-000	1 to 7	A	11 Aug 10	PID Sensor Board1, layout
C03-1003-000	1 to 7	A	11 Aug 10	PID Sensor Board2, layout
C03-1004-000	1 to 7	A	21 Jun 11	LEL/TC Sensor Board, layout
C03-1008-000	1 to 13	C	21 Jun 11	Analog, Smart EC Board, layout
C03-1009-000	1 to 12	B	21 Jun 11	Gamma Preamplifier Board, layout
C03-1012-BOM-CSA	1 of 1	6	21 Jun 11	PID Sensor Board1, BOM [Schedule]
C03-1012-SCH-CSA	1 of 1	7	21 Jun 11	PID Sensor Board1, Schematic [Schedule]
C03-1013-BOM-CSA	1 of 1	1	21 Jun 11	PIC Sensor Board 2, BOM [Schedule]
C03-1013-SCH-CSA	1 of 1	7	21 Jun 11	4R+ PID Sensor SCH2, Schematic
C03-1014-BOM	1 to 2	1	21 Jun 11	LEL/TC Sensor Board, BOM [Schedule]
C03-1014-SCH	1 of 1	4	21 Jun 11	LEL/TC Sensor Board, Schematic [Schedule]
C03-1018-BOM-CSA	1 of 1	4	21 Jun 11	EC Sensor Board, BOM [Schedule]
C03-1018-SCH-CSA	1 of 1	5	21 Jun 11	Analog Board, Schematic [Schedule]
C03-1019-BOM	1 to 2	1.0	21 Jun 11	Gamma Preamplifier Board, BOM [Schedule]
C03-1019-SCH	1 of 1	4	21 Jun 11	Gamma Preamplifier Board, Schematic [Schedule]
C03-1101-000	1 to 10	C	21 Jun 11	Gamma Amplifier Board, layout
C03-1102-000	1 to 11	A	21 Jun 11	Bias Board
C03-1103-000	1 to 13	B	21 Jun 11	Amplify Board, layout
C03-1107-000	1 to 11	B	21 Jun 11	Connect Board, layout
C03-1111-BOM	1 to 2	1.0	21 Jun 11	Gamma Amplifier Board, BOM [Schedule]
C03-1111-SCH	1 of 1	5	21 Jun 11	Gamma Amplifier Board, Schematic [Schedule]
C03-1112-BOM	1 to 2	1	21 Jun 11	Bias Board, BOM [Schedule]
C03-1112-SCH	1 of 1	3	21 Jun 11	Bias Board, Schematic [Schedule]
C03-1113-BOM	1 to 2	2	21 Jun 11	Dual EC Amplifier Board, BOM [Schedule]
C03-1113-SCH	1 of 1	3	21 Jun 11	Dual EC Amplifier Board, Schematic [Schedule]
C03-1117-BOM	1 of 1	1	21 Jun 11	Connect Board, BOM [Schedule]
C03-1117-SCH	1 of 1	1	21 Jun 11	Connect Board, Schematic [Schedule]
M01-0901-ASY	1 of 1	4	21 Jun 11	PGM-62X0 MultiRAE Unit Assembly (pump)
M01-0911-ASY	1 of 1	1	21 Jun 11	PGM-62X0D MultiRAE Unit Assembly (diffusion)
M01-1000-000	1 to 15	B	21 Jun 11	Main Board, layout
M01-1002-000	1 to 11	A	21 Jun 11	Li-ion Battery Pack, layout
M01-1003-000	1 to 11	B	21 Jun 11	Alkaline Battery Pack, layout
M01-1010-BOM	1 to 3	8	21 Jun 11	Main Board, BOM [Schedule]
M01-1010-SCH	1 to 6	8	21 Jun 11	Main Board, Schematic [Schedule]
M01-1012-BOM-1	1 of 1	1	21 Jun 11	Li-ion Battery Board, 1.2 W, BOM [Schedule]
M01-1012-SCH	1 of 1	4	21 Jun 11	Li-ion Battery Board, 1.2 W, Schematic [Schedule]
M01-1013-BOM-1	1 of 1	1	21 Jun 11	Alkaline Battery Board, 1.2 W, BOM [Schedule]
M01-1013-SCH	1 of 1	2	21 Jun 11	Alkaline Battery Board, 1.2 W, Schematic [Schedule]
M01-1016-000-SCH	1 of 1	1	21 Jun 11	LCD Module Protect Board, Schematic

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Certificate Annexe



Certificate Number: Sira 11ATEX2152X
 Equipment: Portable combustible and toxic gas detectors
 Model PGM62a0x, PGM62a6x, and PGM62a8x
 Applicant: Rae Systems Inc.

CERTIFICATION

Drawing No.	Sheets	Rev.	Date (Sira Stamp)	Title
M01-1101-000	1 to 11	A	21 Jun 11	France HTP PCB, layout
M01-1111-BOM	1 of 1	1	21 Jun 11	France HTP Board, BOM [Schedule]
M01-1111-SCH	1 of 1	1	21 Jun 11	France HTP Board, Schematic [Schedule]
M01-1112-BOM-1	1 of 1	1	21 Jun 11	Li-ion Battery Board, 0.8 W, BOM [Schedule]
M01-1112-SCH	1 of 1	2	21 Jun 11	Li-ion Battery Board, 0.8 W, Schematic [Schedule]
M01-1113-BOM-1	1 of 1	1	21 Jun 11	Alkaline Battery Board, 0.8 W, BOM [Schedule]
M01-1113-SCH	1 of 1	2	21 Jun 11	Alkaline Battery Board, 0.8 W, Schematic [Schedule]
M01-3051-CSA-1	1 of 1	1	23 Jun 11	Li-ion Battery Pack Assembly
M01-3052-CSA	1 of 1	3	21 Jun 11	Alkaline Battery Adapter Assembly
M01-3053-CSA-1	1 of 1	1	23 Jun 11	Li-ion Battery Pack Assembly
M01-3054-CSA	1 of 1	2	21 Jun 11	Alkaline Battery Adapter Assembly
M01-4001-LBL-DIF-1	1 of 1	4	21 Jun 11	Label, Diffusion, PGM 62xx
M01-4002-LBL-PMP-1	1 of 1	2	21 Jun 11	Label, Pump, PGM 62xx
M01-4003-CTL-1	1 to 11	A	21 Jun 11	Controlled Portion of the MultiRAE User's Manual
M01-4006-LBL	1 of 1	1	21 Jun 11	Label, Li-Ion Battery Pack
M01-4007-LBL	1 of 1	3	21 Jun 11	Label, Alkaline Battery Adapter
M01-4008-LBL	1 of 1	1	21 Jun 11	Label, Li-Ion Battery Pack
M01-4009-LBL	1 of 1	2	21 Jun 11	Label, Alkaline Battery Adapter
M01-SEN1-CSA	1 to 4	A5	21 Jun 11	List of Electrochemical Sensors for MultiRAE2

Issue 1

Drawing No.	Sheets	Rev.	Date (Sira Stamp)	Title
C03-1008-000	1 to 13	C	11 Nov 10*	Analog, Smart EC Board, layout

*this is the date originally stamped the Revision 'B' status was incorrectly stamped with a later date.

The following drawing is removed: -

Drawing No.	Sheets	Rev.	Date (Stamp)	Title
C03-1113-S00	1 to 2	3	21 Jun 11	EC Amplifier Board

Issue 2

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
C03-1008-000	1 to 14	E	18 Jan 12	Analog, Smart EC Board, layout
C03-1018-SCH-CSA	1 of 1	6	18 Jan 12	Analog Board, Schematic [Schedule]
M01-0911-ASY-IEC	1 of 1	1	18 Jan 12	PGM-62X0 MultiRAE Diffusion Unit Assembly
M01-1004-000	1 to 11	A	18 Jan 12	Diffusion Board
M01-1014-BOM	1 of 1	1	18 Jan 12	Diffusion PCB BOM
M01-1014-SCH	1 of 1	1	18 Jan 12	Diffusion Board, Schematic

Issue 3

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
M01-4001-LBL-DIF-1	1 of 1	6	19 th March 12	Label, Diffusion, PGM 62xx
M01-4002-LBL-PMP-1	1 of 1	4	19 th March 12	Label, Pump, PGM 62xx

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Certificate Annexe

Certificate Number: Sira 11ATEX2152X
Equipment: Portable combustible and toxic gas detectors
Model PGM62a0x, PGM62a6x, and PGM62a8x
Applicant: Rae Systems Inc.



Issue 4

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
M01-0901-ASY	1 to 2	5	2 Jul 12	PGM-62xx MultiRAE2 Unit Assembly (pump)
M01-0911-ASY	1 to 2	2	2 Jul 12	PGM-62xx MultiRAE2 Unit Assembly (diffusion)
M01-1000-000	1 to 15	D	2 Jul 12	Main Board, layout
M01-1010-SCH	1 to 6	9	2 Jul 12	Main Board, Schematic [Schedule]
M01-3055-CSA	1 of 1	2	2 Jul 12	0.8 W Li-Ion Battery Pack, Extended Duration
M01-3056-CSA	1 of 1	2	2 Jul 12	1.2 W Li-Ion Battery Pack, Extended Duration
M01-4001-LBL-DIF-1	1 of 1	7	3 Jul 12	Label, Diffusion, PGM 62xx
M01-4002-LBL-PMP-1	1 of 1	5	2 Jul 12	Label Pump, PGM 62xx
M01-4019-LBL	1 of 1	1	2 Jul 12	Label 0.8 W Li-Ion Battery Pack, Ext'd Dur'n
M01-4020-LBL	1 of 1	1	2 Jul 12	Label 1.2 W Li-Ion Battery Pack, Ext'd Dur'n
M01-SEN1-CSA	1 to 4	A6	2 Jul 12	List of Electrochemical Sensors for MultiRAE2

Note, label drawing changes have been introduced to allow for marking of the alternative battery pack.

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