1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 02ATEX2176X** Issue: **9**

4 Equipment: **Triple Plus+**

5 Applicant: **Crowcon Detection Instruments Ltd**

6 Address: 172 Brook Drive
Milton Park
Abingdon
Oxon OX14 4SD
UK

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:

IEC 60079-0:2007 EN 60079-1:2008 EN 60079-11:2007

The above list of documents may detail standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation, which is available on request

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:

II 2 G
Ex ib d IIC T4 Gb
T_a = -20°C to +50°C

Project Number 70008482

A G Boyes
Certification Support Officer

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13 **DESCRIPTION OF EQUIPMENT**

The Triple Plus+ gas detector (also known as the Tank-Mate or Gaseeker) is a portable, battery-powered instrument comprising the following principal sub-assemblies:

1. Nominally 7.4 V lithium ion encapsulated battery pack (part number C01006) or a nominally 6.0 V lead-acid battery (part number C01253 or S01963) mounted in a separate compartment.
2. Triple Plus main board with an LCD on its own separate PCB mounted piggy-back to the underside – the assembly is mounted in the lid.
3. Safety PCB
4. Sounder PCB and sounder
5. Up to four sensor modules

The sensor modules may be chosen from the following:

- Oxygen
- Toxic
- Biased Toxic
- Flammable
- Thermal Conductivity
- Infra-Red

The modules may be used in any combination but with a maximum of one IR module.

The circuitry is housed in an enclosure manufactured from a non-conducting plastics material, with a separate compartment for the battery pack. The cover incorporates a number of pushbuttons and LEDs, it also has a window to allow viewing of the liquid crystal display. A piezo-electric alarm buzzer is incorporated into the device.

No external electrical connections are permitted while the equipment is in the hazardous area. Charging of the battery is only permitted in the non-hazardous area.

Variation 1 - This variation introduced the following change:

i. To recognise modifications to the oxygen sensor PCB.

Variation 2 - This variation introduced the following changes:

i. To permit the replacement of the lead-acid battery with a type C01006 encapsulated battery pack, designed to be used with the same charger when the equipment is in the non-hazardous area; this battery pack is compatible with previous versions of the equipment
ii. To amend the product description to include the new battery pack and remove the reference to lead-acid batteries
iii. The introduction of two Conditions of Manufacture

Variation 3 - This variation introduced the following changes:

i. An assessment against the latest standards and a corresponding update of the certification marking
ii. A minor modification to the lithium ion battery pack circuit.
iii. The introduction of Condition of Manufacture 17.6

Variation 4 - This variation introduced the following changes:

i. The addition of a window to the leather case which allows viewing of the certification information.
ii. The recognition of a change of part number of the lithium-ion battery pack from C01007 to C01006 on label drawing 2298.

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Variation 5 - This variation introduced the following changes:

i. The removal of the references to the C01007 battery pack in the Description of Equipment, Variation 2 and Conditions of Manufacture.
ii. The introduction of the Tenergy 18650-30012 Li-ion cell (green jacket) as an alternative to the existing GP 1865L220 cell in the C01006 battery pack.

Variation 6 - This variation introduced the following changes:

i. The inductor L2 in the battery pack was changed from type TDK ACM3225-601-2P to type TDK ACP3225-102-2P.

Variation 7 – This variation introduced the following changes:

i. The recognition of a change of company address from 2 Blacklands Way, Abingdon, OX14 1DY to 172 Brook Drive, Milton Park, Abingdon, Oxon OX14 4SD.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report number	Comment
0	24 December 2002	R52A9131A	The release of the prime certificate.
1	15 October 2003	R52A9131B	Re-issued to include variation 1 dated 16 January 2003 and to permit report number R52A9131A to be replaced by report number R52A9131B.
2	16 February 2007	R52L15432B	Re-issued to Introduce the changes described in report number R52L15432B, this involves incorporating variations 1 to 9 dated 23 February 2004, 23 February 2004, 17 August 2004, 10 February 2005, 9 May 2005, 7 October 2005, 11 October 2005, 14 October 2005 and 23 May 2006 respectively
3	7 October 2009	R52L21051A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 3, Issues 0 to 2 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. • The introduction of Variation 1.
4	30 October 2009	R20258A	The introduction of Variation 2
5	12 November 2009	R20258B	The introduction of Variation 3
6	12 August 2010	R23084A/00	The introduction of Variation 4.
7	31 May 2012	R23776A/00	The introduction of Variation 5.
8	07 October 2013	R31603A/00	The introduction of Variation 6.
9	06 August 2014	R70008482A	The introduction of Variation 7.

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

15.1 If the Triple Plus+ is used in the gases associated with apparatus groups IIC (i.e. hydrogen, acetylene or carbon disulphide), it shall be used such that the risk of mechanical impact to the enclosure is low.

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 MANUFACTURE**

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 following sub-assemblies covered by certification drawings to the previous production issues may also be used in the Triple Plus+:

- Oxygen Module Board
- Toxic Module Board
- Bias Toxic Module Board
- Flammable ('Explosive') Module Board
- Thermal Conductivity Module Board
- Infra-Red Module

17.4 The manufacturer shall ensure that the Littelfuse 259.062 fuse has a minimum resistance at +20°C of 3.642 Ω. Measurements may be performed at a temperature other than +20°C, with a correction factor of +0.0360 Ω/K. (Note that the required minimum resistance is significantly below the actual minimum resistance at this temperature, which is approximately 6.6 Ω).

17.5 The manufacturer shall ensure that the Littelfuse 278.100 fuse has a minimum resistance at +20°C of 0.850 Ω. Measurements may be performed at a temperature other than +20°C, with a correction factor of +0.00626 Ω/K. (Note that the required minimum resistance is significantly below the actual minimum resistance at this temperature, which is approximately 1.2 Ω).

17.6 The manufacturer is permitted to use the modified lithium-ion battery pack covered by this issue of the certificate as part of equipment built to previous issues of the certificate. The equipment is compatible with the lithium-ion battery pack (C01006) as well as the lead-acid batteries (C01253 & S01963).

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Certificate Annexe

Certificate Number: **Sira 02ATEX2176X**

Equipment: **Triple Plus+**

Applicant: **Crowcon Detection Instruments Ltd**

Issues 0 to 1 The drawings listed with these Issues were rationalised and have been superseded by those detailed in Issue 2.

Issue 2

Number	Sheet	Rev.	Date (Sira stamp)	Title
IRSM-5152-A3	1 of 1	2	09 Nov 06	IR PCB schematic
P-5109-A4	1 of 1	1	09 Nov 06	Fuse encapsulation details
P-5620-A2	1 of 1	1	09 Nov 06	Membrane keypad detail
TRP-3657-A4	1 of 1	3	15 Feb 07	Certification label
TRP-1630-CL	1 of 1	9	09 Nov 06	Main PCB Silk Screen
TRP-1630-PCA	1 of 1	9	09 Nov 06	Main PCB layer 1 artwork
TRP-1630-PCB	1 of 1	9	09 Nov 06	Main PCB layer 2 artwork
TRP-1630-PCC	1 of 1	9	09 Nov 06	Main PCB layer 3 artwork
TRP-1630-PCD	1 of 1	9	09 Nov 06	Main PCB layer 4 artwork
TRP-1636-CD	1 of 1	12	09 Nov 06	Main PCB schematic
TRP-1637-CD	1 of 1	9	09 Nov 06	Safety PCB schematic
TRP-1638-CD	1 of 2	5	09 Nov 06	Flammable PCB schematic
TRP-1639-CD	1 of 1	6	09 Nov 06	Toxic PCB schematic
TRP-1640-CD	1 of 1	8	09 Nov 06	Oxygen PCB schematic
TRP-1658-CPL	1 of 1	4	09 Nov 06	Safety PCB silkscreen
TRP-1658-PCA	1 of 1	4	09 Nov 06	Safety PCB solder side copper
TRP-1658-PCB	1 of 1	4	09 Nov 06	Safety PCB component side copper
TRP-1663-CD	1 of 1	8	09 Nov 06	Biased toxic schematic
TRP-1688-A3	1 of 1	8	09 Nov 06	Biased toxic PCB artwork
TRP-2317-CD	1 of 1	5	09 Nov 06	TCS PCB schematic
TRP-3638-CD	1 of 1	1	09 Nov 06	Sounder PCB schematic
TRP-3639-CL	1 of 1	1	09 Nov 06	Sounder PCB silkscreen
TRP-3639-PCA	1 of 1	1	09 Nov 06	Sounder PCB component side copper
TRP-3639-PCB	1 of 1	1	09 Nov 06	Sounder PCB solder side copper
TRP-3665-A3	1 of 1	1	09 Nov 06	Thermal conductivity sensor artwork
TRP-3669-A3	1 of 1	1	09 Nov 06	Tripleplus + DCP 2114 Detail
TRPP-3633-A1	1 to 2	1	09 Nov 06	General arrangement
TRPP-3652-A3	1 of 1	1	09 Nov 06	Block diagram
TRPP-3653-A4	1 to 3	11	09 Nov 06	Critical parts list

Issue 3

Drawing No.	Sheets	Rev.	Date	Title
TRP-1640-CD	1 of 1	10	04 Sep 09	Oxygen PCB schematic

Issue 4

Drawing No.	Sheets	Rev.	Date	Title
2298	1 of 1	1	Oct 09	Battery pack cover label – old units
2299	1 of 1	1	Oct 09	Battery pack cover label – new units
40266-300	1 to 3	F	29 Oct 09	Battery pack internal assembly
40266-500	1 of 1	A	30 Oct 09*	Battery pack inner PCB schematic
40266-501	1 of 1	B	30 Oct 09*	Battery pack top PCB schematic
40266-503**	1 to 4	A	30 Oct 09*	Battery pack inner PCB artwork
TRP-3657-A4	1 of 1	4	Oct 09	Certification label

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Certificate Annexe

Certificate Number: **Sira 02ATEX2176X**

Equipment: **Triple Plus+**

Applicant: **Crowcon Detection Instruments Ltd**

Drawing No.	Sheets	Rev.	Date	Title
TRPP-3633-A1	1 to 2	2	Oct 09	General arrangement
TRPP-3652-A3	1 of 1	2	Oct 09	Block diagram
TRPP-3653-A4	1 to 3	12	Oct 09	Critical parts list

* Sira stamp date

** Sheet numbering added by Sira

Issue 5

Drawing No.	Sheets	Rev.	Date	Title
2296	1 of 1	1	04 Nov 09	Littlefuse 259.062 construction
2297	1 of 1	1	Oct 09	Certification label
3684-CERT	1 to 2	1	Nov 09	General assembly
40266-500	1 of 1	B	12 Nov 09*	Battery pack inner PCB schematic
40266-503**	1 to 4	B	12 Nov 09*	Battery pack inner PCB artwork

* Sira stamp date

** Sheet numbering added by Sira

Drawing 2297 supersedes drawing TRP-3657-A4
Drawing 3684-CERT supersedes drawing TRPP-3633-A1

Issue 6

Drawing No.	Sheets	Rev.	Date	Title
2298	1 of 1	2	July 10	Battery pack cover label – old units
3684-CERT	1 to 2	2	Jan 10	General assembly

Issue 7

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
MCAD-001446	1 to 3	1	23 May 12	Battery pack assembly

MCAD-001446 replaces drawing 40266-300.

Issue 8

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
3686-CD	1 of 1	2	7 Oct 13	Battery pack top PCB schematic

3686-CD replaces drawing 40266-501, to comply with Crowcon's new drawing numbering system

Issue 9

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
2297	1 of 1	2	06 Aug 14	Triple Plus+ Certification label for Holster
TRP-3657-A4	1 of 1	5	06 Aug 14	ATEX certification Label Triple Plus+
3683	1 of 1	2	06 Aug 14	ATEX 2007 certification Label Triple Plus+

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1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 02ATEX2176X** Issue: **7**

4 Equipment: **Triple Plus+**

5 Applicant: **Crowcon Detection Instruments Ltd**

6 Address: Blacklands Way
Abingdon OX14 1DY
UK

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:

IEC 60079-0:2007 EN 60079-1:2008 EN 60079-11:2007

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:

II 2 G
Ex ib d IIC T4 Gb
T_a = -20°C to +50°C

C Ellaby
Deputy Certification Manager

Project Number 23776

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE **Sira 02ATEX2176X**
Issue 7

13 **DESCRIPTION OF EQUIPMENT**

The Triple Plus+ gas detector (also known as the Tank-Mate or Gaseeker) is a portable, battery-powered instrument comprising the following principal sub-assemblies:

1. Nominally 7.4 V lithium ion encapsulated battery pack (part number C01006) or a nominally 6.0 V lead-acid battery (part number C01253 or S01963) mounted in a separate compartment.
2. Triple Plus main board with an LCD on its own separate PCB mounted piggy-back to the underside – the assembly is mounted in the lid.
3. Safety PCB
4. Sounder PCB and sounder
5. Up to four sensor modules

The sensor modules may be chosen from the following:

- Oxygen
- Toxic
- Biased Toxic
- Flammable
- Thermal Conductivity
- Infra-Red

The modules may be used in any combination but with a maximum of one IR module.

The circuitry is housed in an enclosure manufactured from a non-conducting plastics material, with a separate compartment for the battery pack. The cover incorporates a number of pushbuttons and LEDs, it also has a window to allow viewing of the liquid crystal display. A piezo-electric alarm buzzer is incorporated into the device.

No external electrical connections are permitted while the equipment is in the hazardous area. Charging of the battery is only permitted in the non-hazardous area.

Variation 1 - This variation introduced the following change:

i. To recognise modifications to the oxygen sensor PCB.

Variation 2 - This variation introduced the following changes:

i. To permit the replacement of the lead-acid battery with a type C01006 encapsulated battery pack, designed to be used with the same charger when the equipment is in the non-hazardous area; this battery pack is compatible with previous versions of the equipment
ii. To amend the product description to include the new battery pack and remove the reference to lead-acid batteries
iii. The introduction of two Conditions of Manufacture

Variation 3 - This variation introduced the following changes:

i. An assessment against the latest standards and a corresponding update of the certification marking
ii. A minor modification to the lithium ion battery pack circuit.
iii. The introduction of Condition of Manufacture 17.6

Variation 4 - This variation introduced the following changes:

i. The addition of a window to the leather case which allows viewing of the certification information.
ii. The recognition of a change of part number of the lithium-ion battery pack from C01007 to C01006 on label drawing 2298.

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Variation 5 - This variation introduced the following changes:

i. The removal of the references to the C01007 battery pack in the Description of Equipment, Variation 2 and Conditions of Manufacture.
ii. The introduction of the Tenergy 18650-30012 Li-ion cell (green jacket) as an alternative to the existing GP 1865L220 cell in the C01006 battery pack.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report number	Comment
0	24 December 2002	R52A9131A	The release of the prime certificate.
1	15 October 2003	R52A9131B	Re-issued to include variation 1 dated 16 January 2003 and to permit report number R52A9131A to be replaced by report number R52A9131B.
2	16 February 2007	R52L15432B	Re-issued to Introduce the changes described in report number R52L15432B, this involves incorporating variations 1 to 9 dated 23 February 2004, 23 February 2004, 17 August 2004, 10 February 2005, 9 May 2005, 7 October 2005, 11 October 2005, 14 October 2005 and 23 May 2006 respectively
3	7 October 2009	R52L21051A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 3, Issues 0 to 2 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. • The introduction of Variation 1.
4	30 October 2009	R20258A	The introduction of Variation 2
5	12 November 2009	R20258B	The introduction of Variation 3
6	12 August 2010	R23084A/00	The introduction of Variation 4.
7	31 May 2012	R23776A/00	The introduction of Variation 5.

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

15.1 If the Triple Plus+ is used in the gases associated with apparatus groups IIC (i.e. hydrogen, acetylene or carbon disulphide), it shall be used such that the risk of mechanical impact to the enclosure is low.

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.

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17 **CONDITIONS OF MANUFACTURE**

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 following sub-assemblies covered by certification drawings to the previous production issues may also be used in the Triple Plus+:

- Oxygen Module Board
- Toxic Module Board
- Bias Toxic Module Board
- Flammable ('Explosive') Module Board
- Thermal Conductivity Module Board
- Infra-Red Module

17.4 The manufacturer shall ensure that the Littelfuse 259.062 fuse has a minimum resistance at +20°C of 3.642 Ω. Measurements may be performed at a temperature other than +20°C, with a correction factor of +0.0360 Ω/K. (Note that the required minimum resistance is significantly below the actual minimum resistance at this temperature, which is approximately 6.6 Ω).

17.5 The manufacturer shall ensure that the Littelfuse 278.100 fuse has a minimum resistance at +20°C of 0.850 Ω. Measurements may be performed at a temperature other than +20°C, with a correction factor of +0.00626 Ω/K. (Note that the required minimum resistance is significantly below the actual minimum resistance at this temperature, which is approximately 1.2 Ω).

17.6 The manufacturer is permitted to use the modified lithium-ion battery pack covered by this issue of the certificate as part of equipment built to previous issues of the certificate. The equipment is compatible with the lithium-ion battery pack (C01006) as well as the lead-acid batteries (C01253 & S01963).

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Certificate Annexe

Certificate Number: **Sira 02ATEX2176X**

Equipment: **Triple Plus+**

Applicant: **Crowcon Detection Instruments Ltd**

Issues 0 to 1 The drawings listed with these Issues were rationalised and have been superseded by those detailed in Issue 2.

Issue 2

Number	Sheet	Rev.	Date (Sira stamp)	Title
IRSM-5152-A3	1 of 1	2	09 Nov 06	IR PCB schematic
P-5109-A4	1 of 1	1	09 Nov 06	Fuse encapsulation details
P-5620-A2	1 of 1	1	09 Nov 06	Membrane keypad detail
TRP-3657-A4	1 of 1	3	15 Feb 07	Certification label
TRP-1630-CL	1 of 1	9	09 Nov 06	Main PCB Silk Screen
TRP-1630-PCA	1 of 1	9	09 Nov 06	Main PCB layer 1 artwork
TRP-1630-PCB	1 of 1	9	09 Nov 06	Main PCB layer 2 artwork
TRP-1630-PCC	1 of 1	9	09 Nov 06	Main PCB layer 3 artwork
TRP-1630-PCD	1 of 1	9	09 Nov 06	Main PCB layer 4 artwork
TRP-1636-CD	1 of 1	12	09 Nov 06	Main PCB schematic
TRP-1637-CD	1 of 1	9	09 Nov 06	Safety PCB schematic
TRP-1638-CD	1 of 2	5	09 Nov 06	Flammable PCB schematic
TRP-1639-CD	1 of 1	6	09 Nov 06	Toxic PCB schematic
TRP-1640-CD	1 of 1	8	09 Nov 06	Oxygen PCB schematic
TRP-1658-CPL	1 of 1	4	09 Nov 06	Safety PCB silkscreen
TRP-1658-PCA	1 of 1	4	09 Nov 06	Safety PCB solder side copper
TRP-1658-PCB	1 of 1	4	09 Nov 06	Safety PCB component side copper
TRP-1663-CD	1 of 1	8	09 Nov 06	Biased toxic schematic
TRP-1688-A3	1 of 1	8	09 Nov 06	Biased toxic PCB artwork
TRP-2317-CD	1 of 1	5	09 Nov 06	TCS PCB schematic
TRP-3638-CD	1 of 1	1	09 Nov 06	Sounder PCB schematic
TRP-3639-CL	1 of 1	1	09 Nov 06	Sounder PCB silkscreen
TRP-3639-PCA	1 of 1	1	09 Nov 06	Sounder PCB component side copper
TRP-3639-PCB	1 of 1	1	09 Nov 06	Sounder PCB solder side copper
TRP-3665-A3	1 of 1	1	09 Nov 06	Thermal conductivity sensor artwork
TRP-3669-A3	1 of 1	1	09 Nov 06	Tripleplus + DCP 2114 Detail
TRPP-3633-A1	1 to 2	1	09 Nov 06	General arrangement
TRPP-3652-A3	1 of 1	1	09 Nov 06	Block diagram
TRPP-3653-A4	1 to 3	11	09 Nov 06	Critical parts list

Issue 3

Drawing no.	Sheets	Rev.	Date	Title
TRP-1640-CD	1 of 1	10	04 Sep 09	Oxygen PCB schematic

Issue 4

Drawing no.	Sheets	Rev.	Date	Title
2298	1 of 1	1	Oct 09	Battery pack cover label – old units
2299	1 of 1	1	Oct 09	Battery pack cover label – new units
40266-300	1 to 3	F	29 Oct 09	Battery pack internal assembly
40266-500	1 of 1	A	30 Oct 09*	Battery pack inner PCB schematic
40266-501	1 of 1	B	30 Oct 09*	Battery pack top PCB schematic
40266-503**	1 to 4	A	30 Oct 09*	Battery pack inner PCB artwork
TRP-3657-A4	1 of 1	4	Oct 09	Certification label
TRPP-3633-A1	1 to 2	2	Oct 09	General arrangement

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Certificate Annexe

Certificate Number: **Sira 02ATEX2176X**

Equipment: **Triple Plus+**

Applicant: **Crowcon Detection Instruments Ltd**

Drawing no.	Sheets	Rev.	Date	Title
TRPP-3652-A3	1 of 1	2	Oct 09	Block diagram
TRPP-3653-A4	1 to 3	12	Oct 09	Critical parts list

* Sira stamp date
** Sheet numbering added by Sira

Issue 5

Drawing no.	Sheets	Rev.	Date	Title
2296	1 of 1	1	04 Nov 09	Littlefuse 259.062 construction
2297	1 of 1	1	Oct 09	Certification label
3684-CERT	1 to 2	1	Nov 09	General assembly
40266-500	1 of 1	B	12 Nov 09*	Battery pack inner PCB schematic
40266-503**	1 to 4	B	12 Nov 09*	Battery pack inner PCB artwork

* Sira stamp date
** Sheet numbering added by Sira

Drawing 2297 supersedes drawing TRP-3657-A4
Drawing 3684-CERT supersedes drawing TRPP-3633-A1

Issue 6

Drawing no.	Sheets	Rev.	Date	Title
2298	1 of 1	2	July 10	Battery pack cover label – old units
3684-CERT	1 to 2	2	Jan 10	General assembly

Issue 7

Drawing no.	Sheets	Rev.	Date (Sira stamp)	Title
MCAD-001446	1 to 3	1	23 May 12	Battery pack assembly

MCAD-001446 replaces drawing 40266-300.

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1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 02ATEX2176X** Issue: **6**

4 Equipment: **Triple Plus+**

5 Applicant: **Crowcon Detection Instruments Ltd**

6 Address: Blacklands Way
Abingdon
OX14 1DY
UK

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:

IEC 60079-0:2007 EN 60079-1:2008 EN 60079-11:2007

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:

II 2 G
Ex ib d IIC T4 Gb
T_a = -20°C to +50°C

Project Number 23084
C. Index 14

D R Stubbings BA MIET
Certification Manager

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13 **DESCRIPTION OF EQUIPMENT**

The Triple Plus+ gas detector (also known as the Tank-Mate or Gaseeker) is a portable, battery-powered instrument comprising the following principal sub-assemblies:

1. Nominally 7.4 V lithium ion encapsulated battery pack (part number C01006 or C01007) or a nominally 6.0 V lead-acid battery (part number C01253 or S01963) mounted in a separate compartment
2. Triple Plus main board with an LCD on its own separate PCB mounted piggy-back to the underside – the assembly is mounted in the lid
3. Safety PCB
4. Sounder PCB and sounder
5. Up to four sensor modules

The sensor modules may be chosen from the following:

- Oxygen
- Toxic
- Biased Toxic
- Flammable
- Thermal Conductivity
- Infra-Red

The modules may be used in any combination but with a maximum of one IR module.

The circuitry is housed in an enclosure manufactured from a non-conducting plastics material, with a separate compartment for the battery pack. The cover incorporates a number of pushbuttons and LEDs, it also has a window to allow viewing of the liquid crystal display. A piezo-electric alarm buzzer is incorporated into the device.

No external electrical connections are permitted while the equipment is in the hazardous area. Charging of the battery is only permitted in the non-hazardous area.

Variation 1 - This variation introduced the following change:

i. To recognise modifications to the oxygen sensor PCB.

Variation 2 - This variation introduced the following changes:

i. To permit the replacement of the lead-acid battery with a type C01006 or C01007 encapsulated battery pack, designed to be used with the same charger when the equipment is in the non-hazardous area; this battery pack is compatible with previous versions of the equipment
ii. To amend the product description to include the new battery pack and remove the reference to lead-acid batteries
iii. The introduction of two Conditions of Manufacture

Variation 3 - This variation introduced the following changes:

i. An assessment against the latest standards and a corresponding update of the certification marking
ii. A minor modification to the lithium ion battery pack circuit.
iii. The introduction of Condition of Manufacture 17.6

Variation 4 - This variation introduced the following changes:

i. The addition of a window to the leather case which allows viewing of the certification information.
ii. The recognition of a change of part number of the lithium-ion battery pack from C01007 to C01006 on label drawing 2298.

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14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report number	Comment
0	24 December 2002	R52A9131A	The release of the prime certificate.
1	15 October 2003	R52A9131B	Re-issued to include variation 1 dated 16 January 2003 and to permit report number R52A9131A to be replaced by report number R52A9131B.
2	16 February 2007	R52L15432B	Re-issued to Introduce the changes described in report number R52L15432B, this involves incorporating variations 1 to 9 dated 23 February 2004, 23 February 2004, 17 August 2004, 10 February 2005, 9 May 2005, 7 October 2005, 11 October 2005, 14 October 2005 and 23 May 2006 respectively
3	7 October 2009	R52L21051A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 3, Issues 0 to 2 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. • The introduction of Variation 1.
4	30 October 2009	R20258A	The introduction of Variation 2
5	12 November 2009	R20258B	The introduction of Variation 3
6	12 August 2010	R23084A/00	The introduction of Variation 4.

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

15.1 If the Triple Plus+ is used in the gases associated with apparatus groups IIC (i.e. hydrogen, acetylene or carbon disulphide), it shall be used such that the risk of mechanical impact to the enclosure is low.

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 MANUFACTURE

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.

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17.3 The following sub-assemblies covered by certification drawings to the previous production issues may also be used in the Triple Plus+:

- Oxygen Module Board
- Toxic Module Board
- Bias Toxic Module Board
- Flammable ('Explosive') Module Board
- Thermal Conductivity Module Board
- Infra-Red Module

17.4 The manufacturer shall ensure that the Littelfuse 259.062 fuse has a minimum resistance at +20°C of 3.642 Ω. Measurements may be performed at a temperature other than +20°C, with a correction factor of +0.0360 Ω/K. (Note that the required minimum resistance is significantly below the actual minimum resistance at this temperature, which is approximately 6.6 Ω).

17.5 The manufacturer shall ensure that the Littelfuse 278.100 fuse has a minimum resistance at +20°C of 0.850 Ω. Measurements may be performed at a temperature other than +20°C, with a correction factor of +0.00626 Ω/K. (Note that the required minimum resistance is significantly below the actual minimum resistance at this temperature, which is approximately 1.2 Ω).

17.6 The manufacturer is permitted to use the modified lithium-ion battery pack covered by this issue of the certificate as part of equipment built to previous issues of the certificate. The equipment is compatible with the lithium-ion battery packs (C01006 & C01007) as well as the lead-acid batteries (C01253 & S01963).

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Certificate Annexe

Certificate Number: **Sira 02ATEX2176X**

Equipment: **Triple Plus+**

Applicant: **Crowcon Detection Instruments Ltd**

Issues 0 to 1 The drawings listed with these Issues were rationalised and have been superseded by those detailed in Issue 2.

Issue 2

Number	Sheet	Rev.	Date (Sira stamp)	Title
IRSM-5152-A3	1 of 1	2	09 Nov 06	IR PCB schematic
P-5109-A4	1 of 1	1	09 Nov 06	Fuse encapsulation details
P-5620-A2	1 of 1	1	09 Nov 06	Membrane keypad detail
TRP-3657-A4	1 of 1	3	15 Feb 07	Certification label
TRP-1630-CL	1 of 1	9	09 Nov 06	Main PCB Silk Screen
TRP-1630-PCA	1 of 1	9	09 Nov 06	Main PCB layer 1 artwork
TRP-1630-PCB	1 of 1	9	09 Nov 06	Main PCB layer 2 artwork
TRP-1630-PCC	1 of 1	9	09 Nov 06	Main PCB layer 3 artwork
TRP-1630-PCD	1 of 1	9	09 Nov 06	Main PCB layer 4 artwork
TRP-1636-CD	1 of 1	12	09 Nov 06	Main PCB schematic
TRP-1637-CD	1 of 1	9	09 Nov 06	Safety PCB schematic
TRP-1638-CD	1 of 2	5	09 Nov 06	Flammable PCB schematic
TRP-1639-CD	1 of 1	6	09 Nov 06	Toxic PCB schematic
TRP-1640-CD	1 of 1	8	09 Nov 06	Oxygen PCB schematic
TRP-1658-CPL	1 of 1	4	09 Nov 06	Safety PCB silkscreen
TRP-1658-PCA	1 of 1	4	09 Nov 06	Safety PCB solder side copper
TRP-1658-PCB	1 of 1	4	09 Nov 06	Safety PCB component side copper
TRP-1663-CD	1 of 1	8	09 Nov 06	Biased toxic schematic
TRP-1688-A3	1 of 1	8	09 Nov 06	Biased toxic PCB artwork
TRP-2317-CD	1 of 1	5	09 Nov 06	TCS PCB schematic
TRP-3638-CD	1 of 1	1	09 Nov 06	Sounder PCB schematic
TRP-3639-CL	1 of 1	1	09 Nov 06	Sounder PCB silkscreen
TRP-3639-PCA	1 of 1	1	09 Nov 06	Sounder PCB component side copper
TRP-3639-PCB	1 of 1	1	09 Nov 06	Sounder PCB solder side copper
TRP-3665-A3	1 of 1	1	09 Nov 06	Thermal conductivity sensor artwork
TRP-3669-A3	1 of 1	1	09 Nov 06	Tripleplus + DCP 2114 Detail
TRPP-3633-A1	1 to 2	1	09 Nov 06	General arrangement
TRPP-3652-A3	1 of 1	1	09 Nov 06	Block diagram
TRPP-3653-A4	1 to 3	11	09 Nov 06	Critical parts list

Issue 3

Drawing no.	Sheets	Rev.	Date	Title
TRP-1640-CD	1 of 1	10	04 Sep 09	Oxygen PCB schematic

Issue 4

Drawing no.	Sheets	Rev.	Date	Title
2298	1 of 1	1	Oct 09	Battery pack cover label – old units
2299	1 of 1	1	Oct 09	Battery pack cover label – new units
40266-300	1 to 3	F	29 Oct 09	Battery pack internal assembly
40266-500	1 of 1	A	30 Oct 09*	Battery pack inner PCB schematic
40266-501	1 of 1	B	30 Oct 09*	Battery pack top PCB schematic
40266-503**	1 to 4	A	30 Oct 09*	Battery pack inner PCB artwork
TRP-3657-A4	1 of 1	4	Oct 09	Certification label
TRPP-3633-A1	1 to 2	2	Oct 09	General arrangement

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Certificate Annexe

Certificate Number: **Sira 02ATEX2176X**

Equipment: **Triple Plus+**

Applicant: **Crowcon Detection Instruments Ltd**

Drawing no.	Sheets	Rev.	Date	Title
TRPP-3652-A3	1 of 1	2	Oct 09	Block diagram
TRPP-3653-A4	1 to 3	12	Oct 09	Critical parts list

* Sira stamp date

** Sheet numbering added by Sira

Issue 5

Drawing no.	Sheets	Rev.	Date	Title
2296	1 of 1	1	04 Nov 09	Littlefuse 259.062 construction
2297	1 of 1	1	Oct 09	Certification label
3684-CERT	1 to 2	1	Nov 09	General assembly
40266-500	1 of 1	B	12 Nov 09*	Battery pack inner PCB schematic
40266-503**	1 to 4	B	12 Nov 09*	Battery pack inner PCB artwork

* Sira stamp date

** Sheet numbering added by Sira

Drawing 2297 supersedes drawing TRP-3657-A4
Drawing 3684-CERT supersedes drawing TRPP-3633-A1

Issue 6

Drawing no.	Sheets	Rev.	Date	Title
2298	1 of 1	2	July 10	Battery pack cover label – old units
3684-CERT	1 to 2	2	Jan 10	General assembly

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1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 02ATEX2176X** Issue: **5**

4 Equipment: **Triple Plus+**

5 Applicant: **Crowcon Detection Instruments Ltd**

6 Address: Blacklands Way
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UK

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:

IEC 60079-0:2007 EN 60079-1:2008 EN 60079-11:2007

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:

II 2 G
Ex ib d IIC T4 Gb
T_a = -20°C to +50°C

Project Number 52L20258
C. Index 14

R Stubbings BA MIET
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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 02ATEX2176X
Issue 5

13 **DESCRIPTION OF EQUIPMENT**

The Triple Plus+ gas detector (also known as the Tank-Mate or Gaseeker) is a portable, battery-powered instrument comprising the following principal sub-assemblies:

1. Nominally 7.4 V lithium ion encapsulated battery pack (part number C01006 or C01007) or a nominally 6.0 V lead-acid battery (part number C01253 or S01963) mounted in a separate compartment
2. Triple Plus main board with an LCD on its own separate PCB mounted piggy-back to the underside – the assembly is mounted in the lid
3. Safety PCB
4. Sounder PCB and sounder
5. Up to four sensor modules

The sensor modules may be chosen from the following:

- Oxygen
- Toxic
- Biased Toxic
- Flammable
- Thermal Conductivity
- Infra-Red

The modules may be used in any combination but with a maximum of one IR module.

The circuitry is housed in an enclosure manufactured from a non-conducting plastics material, with a separate compartment for the battery pack. The cover incorporates a number of pushbuttons and LEDs, it also has a window to allow viewing of the liquid crystal display. A piezo-electric alarm buzzer is incorporated into the device.

No external electrical connections are permitted while the equipment is in the hazardous area. Charging of the battery is only permitted in the non-hazardous area.

Variation 1 - This variation introduced the following change:

i. To recognise modifications to the oxygen sensor PCB.

Variation 2 - This variation introduced the following changes:

i. To permit the replacement of the lead-acid battery with a type C01006 or C01007 encapsulated battery pack, designed to be used with the same charger when the equipment is in the non-hazardous area; this battery pack is compatible with previous versions of the equipment
ii. To amend the product description to include the new battery pack and remove the reference to lead-acid batteries
iii. The introduction of two Conditions of Manufacture

Variation 3 - This variation introduced the following changes:

i. An assessment against the latest standards and a corresponding update of the certification marking
ii. A minor modification to the lithium ion battery pack circuit
iii. The introduction of Condition of Manufacture 17.6

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14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report number	Comment
0	24 December 2002	R52A9131A	The release of the prime certificate.
1	15 October 2003	R52A9131B	Re-issued to include variation 1 dated 16 January 2003 and to permit report number R52A9131A to be replaced by report number R52A9131B.
2	16 February 2007	R52L15432B	Re-issued to Introduce the changes described in report number R52L15432B, this involves incorporating variations 1 to 9 dated 23 February 2004, 23 February 2004, 17 August 2004, 10 February 2005, 9 May 2005, 7 October 2005, 11 October 2005, 14 October 2005 and 23 May 2006 respectively
3	7 October 2009	R52L21051A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 3, Issues 0 to 2 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. • The introduction of Variation 1.
4	30 October 2009	R20258A	This Issue covers the following change: • The introduction of Variation 2
5	12 November 2009	R20258B	This Issue covers the following change: • The introduction of Variation 3

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

15.1 If the Triple Plus+ is used in the gases associated with apparatus groups IIC (i.e. hydrogen, acetylene or carbon disulphide), it shall be used such that the risk of mechanical impact to the enclosure is low.

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 MANUFACTURE

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.

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17.3 The following sub-assemblies covered by certification drawings to the previous production issues may also be used in the Triple Plus+:

- Oxygen Module Board
- Toxic Module Board
- Bias Toxic Module Board
- Flammable ('Explosive') Module Board
- Thermal Conductivity Module Board
- Infra-Red Module

17.4 The manufacturer shall ensure that the Littelfuse 259.062 fuse has a minimum resistance at +20°C of 3.642 Ω. Measurements may be performed at a temperature other than +20°C, with a correction factor of +0.0360 Ω/K. (Note that the required minimum resistance is significantly below the actual minimum resistance at this temperature, which is approximately 6.6 Ω).

17.5 The manufacturer shall ensure that the Littelfuse 278.100 fuse has a minimum resistance at +20°C of 0.850 Ω. Measurements may be performed at a temperature other than +20°C, with a correction factor of +0.00626 Ω/K. (Note that the required minimum resistance is significantly below the actual minimum resistance at this temperature, which is approximately 1.2 Ω).

17.6 The manufacturer is permitted to use the modified lithium-ion battery pack covered by this issue of the certificate as part of equipment built to previous issues of the certificate. The equipment is compatible with the lithium-ion battery packs (C01006 & C01007) as well as the lead-acid batteries (C01253 & S01963).

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Certificate Annexe

Certificate Number: **Sira 02ATEX2176X**

Equipment: **Triple Plus+**

Applicant: **Crowcon Detection Instruments Ltd**

Issues 0 to 1 The drawings listed with these Issues were rationalised and have been superseded by those detailed in Issue 2.

Issue 2

Number	Sheet	Rev.	Date (Sira stamp)	Title
IRSM-5152-A3	1 of 1	2	09 Nov 06	IR PCB schematic
P-5109-A4	1 of 1	1	09 Nov 06	Fuse encapsulation details
P-5620-A2	1 of 1	1	09 Nov 06	Membrane keypad detail
TRP-3657-A4	1 of 1	3	15 Feb 07	Certification label
TRP-1630-CL	1 of 1	9	09 Nov 06	Main PCB Silk Screen
TRP-1630-PCA	1 of 1	9	09 Nov 06	Main PCB layer 1 artwork
TRP-1630-PCB	1 of 1	9	09 Nov 06	Main PCB layer 2 artwork
TRP-1630-PCC	1 of 1	9	09 Nov 06	Main PCB layer 3 artwork
TRP-1630-PCD	1 of 1	9	09 Nov 06	Main PCB layer 4 artwork
TRP-1636-CD	1 of 1	12	09 Nov 06	Main PCB schematic
TRP-1637-CD	1 of 1	9	09 Nov 06	Safety PCB schematic
TRP-1638-CD	1 of 2	5	09 Nov 06	Flammable PCB schematic
TRP-1639-CD	1 of 1	6	09 Nov 06	Toxic PCB schematic
TRP-1640-CD	1 of 1	8	09 Nov 06	Oxygen PCB schematic
TRP-1658-CPL	1 of 1	4	09 Nov 06	Safety PCB silkscreen
TRP-1658-PCA	1 of 1	4	09 Nov 06	Safety PCB solder side copper
TRP-1658-PCB	1 of 1	4	09 Nov 06	Safety PCB component side copper
TRP-1663-CD	1 of 1	8	09 Nov 06	Biased toxic schematic
TRP-1688-A3	1 of 1	8	09 Nov 06	Biased toxic PCB artwork
TRP-2317-CD	1 of 1	5	09 Nov 06	TCS PCB schematic
TRP-3638-CD	1 of 1	1	09 Nov 06	Sounder PCB schematic
TRP-3639-CL	1 of 1	1	09 Nov 06	Sounder PCB silkscreen
TRP-3639-PCA	1 of 1	1	09 Nov 06	Sounder PCB component side copper
TRP-3639-PCB	1 of 1	1	09 Nov 06	Sounder PCB solder side copper
TRP-3665-A3	1 of 1	1	09 Nov 06	Thermal conductivity sensor artwork
TRP-3669-A3	1 of 1	1	09 Nov 06	Tripleplus + DCP 2114 Detail
TRPP-3633-A1	1 to 2	1	09 Nov 06	General arrangement
TRPP-3652-A3	1 of 1	1	09 Nov 06	Block diagram
TRPP-3653-A4	1 to 3	11	09 Nov 06	Critical parts list

Issue 3

Drawing no.	Sheets	Rev.	Date	Title
TRP-1640-CD	1 of 1	10	04 Sep 09	Oxygen PCB schematic

Issue 4

Drawing no.	Sheets	Rev.	Date	Title
2298	1 of 1	1	Oct 09	Battery pack cover label – old units
2299	1 of 1	1	Oct 09	Battery pack cover label – new units
40266-300	1 to 3	F	29 Oct 09	Battery pack internal assembly
40266-500	1 of 1	A	30 Oct 09*	Battery pack inner PCB schematic
40266-501	1 of 1	B	30 Oct 09*	Battery pack top PCB schematic
40266-503**	1 to 4	A	30 Oct 09*	Battery pack inner PCB artwork
TRP-3657-A4	1 of 1	4	Oct 09	Certification label
TRPP-3633-A1	1 to 2	2	Oct 09	General arrangement

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Certificate Annexe

Certificate Number: **Sira 02ATEX2176X**

Equipment: **Triple Plus+**

Applicant: **Crowcon Detection Instruments Ltd**

Drawing no.	Sheets	Rev.	Date	Title
TRPP-3652-A3	1 of 1	2	Oct 09	Block diagram
TRPP-3653-A4	1 to 3	12	Oct 09	Critical parts list

* Sira stamp date

** Sheet numbering added by Sira

Issue 5

Drawing no.	Sheets	Rev.	Date	Title
2296	1 of 1	1	04 Nov 09	Littlefuse 259.062 construction
2297	1 of 1	1	Oct 09	Certification label
3684-CERT	1 to 2	1	Nov 09	General assembly
40266-500	1 of 1	B	12 Nov 09*	Battery pack inner PCB schematic
40266-503**	1 to 4	B	12 Nov 09*	Battery pack inner PCB artwork

* Sira stamp date

** Sheet numbering added by Sira

Drawing 2297 supersedes drawing TRP-3657-A4

Drawing 3684-CERT supersedes drawing TRPP-3633-A1

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1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 02ATEX2176X** Issue: **4**

4 Equipment: **Triple Plus+**

5 Applicant: **Crowcon Detection Instruments Ltd**

6 Address: Blacklands Way
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UK

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:

IEC 60079-0:2000 IEC 60079-1:2003 IEC 60079-11:1999

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:

II 2 G
Ex ib d IIC T4
T_a = -20°C to +50°C

D R Stubbings BA MIET
Certification Manager

Project Number 52L21051
C. Index 14

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 02ATEX2176X
Issue 4

13 **DESCRIPTION OF EQUIPMENT**

The Triple Plus+ gas detector, which may also be called a Tank-Mate or a Gaseeker, is a portable battery-powered instrument comprising the following principal sub-assemblies:

1. Nominally 7.4 V lithium ion encapsulated battery pack (part number C01006 or C01007) mounted in a separate compartment
2. Triple Plus main board with an LCD on its own separate PCB mounted piggy-back to the underside – the assembly is mounted in the lid
3. Safety PCB
4. Sounder PCB and sounder
5. Up to four sensor modules

The sensor modules may be chosen from the following:

- Oxygen
- Toxic
- Biased Toxic
- Flammable
- Thermal Conductivity
- Infra-Red

The modules may be used in any combination but with a maximum of one IR module.

The circuitry is housed in an enclosure manufactured from a non-conducting plastics material, with a separate compartment for the battery pack. The cover incorporates a number of pushbuttons and LEDs, it also has a window to allow viewing of the liquid crystal display. A piezo-electric alarm buzzer is incorporated into the device.

No external electrical connections are permitted while the equipment is in the hazardous area. Charging of the battery is only permitted in the non-hazardous area.

Variation 1 - This variation introduced the following change:

i. To recognise modifications to the oxygen sensor PCB.

Variation 2 - This variation introduced the following changes:

i. To permit the replacement of the lead-acid battery with a type C01006 or C01007 encapsulated battery pack, designed to be used with the same charger when the equipment is in the non-hazardous area; this battery pack is compatible with previous versions of the equipment
ii. To amend the product description to include the new battery pack and remove the reference to lead-acid batteries
iii. The introduction of two Conditions of Manufacture

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SCHEDULE

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Sira 02ATEX2176X
Issue 4

14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Sira Reports and Certificate History**

Issue	Date	Report number	Comment
0	24 December 2002	R52A9131A	The release of the prime certificate.
1	15 October 2003	R52A9131B	Re-issued to include variation 1 dated 16 January 2003 and to permit report number R52A9131A to be replaced by report number R52A9131B.
2	16 February 2007	R52L15432B	Re-issued to Introduce the changes described in report number R52L15432B, this involves incorporating variations 1 to 9 dated 23 February 2004, 23 February 2004, 17 August 2004, 10 February 2005, 9 May 2005, 7 October 2005, 11 October 2005, 14 October 2005 and 23 May 2006 respectively
3	7 October 2009	R52L21051A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 3, Issues 0 to 2 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. • The introduction of Variation 1.
4	30 October 2009	R20258A	This Issue covers the following change: • The introduction of Variation 2

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

15.1 If the Triple Plus+ is used in the gases associated with apparatus groups IIC (i.e. hydrogen, acetylene or carbon disulphide), it shall be used such that the risk of mechanical impact to the enclosure is low.

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 MANUFACTURE**

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.

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17.3 The following sub-assemblies covered by certification drawings to the previous production issues may also be used in the Triple Plus+:

- Oxygen Module Board
- Toxic Module Board
- Bias Toxic Module Board
- Flammable ('Explosive') Module Board
- Thermal Conductivity Module Board
- Infra-Red Module

17.4 The manufacturer shall ensure that the Littelfuse 259.062 fuse has a minimum resistance at +20°C of 3.642 Ω. Measurements may be performed at a temperature other than +20°C, with a correction factor of +0.0360 Ω/K. (Note that the required minimum resistance is significantly below the actual minimum resistance at this temperature, which is approximately 6.6 Ω).

17.5 The manufacturer shall ensure that the Littelfuse 278.100 fuse has a minimum resistance at +20°C of 0.850 Ω. Measurements may be performed at a temperature other than +20°C, with a correction factor of +0.00626 Ω/K. (Note that the required minimum resistance is significantly below the actual minimum resistance at this temperature, which is approximately 1.2 Ω).

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Certificate Annexe

Certificate Number: **Sira 02ATEX2176X**

Equipment: **Triple Plus+**

Applicant: **Crowcon Detection Instruments Ltd**

Issues 0 to 1 The drawings listed with these Issues were rationalised and have been superseded by those detailed in Issue 2.

Issue 2

Number	Sheet	Rev.	Date (Sira stamp)	Title
IRSM-5152-A3	1 of 1	2	09 Nov 06	IR PCB schematic
P-5109-A4	1 of 1	1	09 Nov 06	Fuse encapsulation details
P-5620-A2	1 of 1	1	09 Nov 06	Membrane keypad detail
TRP-3657-A4	1 of 1	3	15 Feb 07	Certification label
TRP-1630-CL	1 of 1	9	09 Nov 06	Main PCB Silk Screen
TRP-1630-PCA	1 of 1	9	09 Nov 06	Main PCB layer 1 artwork
TRP-1630-PCB	1 of 1	9	09 Nov 06	Main PCB layer 2 artwork
TRP-1630-PCC	1 of 1	9	09 Nov 06	Main PCB layer 3 artwork
TRP-1630-PCD	1 of 1	9	09 Nov 06	Main PCB layer 4 artwork
TRP-1636-CD	1 of 1	12	09 Nov 06	Main PCB schematic
TRP-1637-CD	1 of 1	9	09 Nov 06	Safety PCB schematic
TRP-1638-CD	1 of 2	5	09 Nov 06	Flammable PCB schematic
TRP-1639-CD	1 of 1	6	09 Nov 06	Toxic PCB schematic
TRP-1640-CD	1 of 1	8	09 Nov 06	Oxygen PCB schematic
TRP-1658-CPL	1 of 1	4	09 Nov 06	Safety PCB silkscreen
TRP-1658-PCA	1 of 1	4	09 Nov 06	Safety PCB solder side copper
TRP-1658-PCB	1 of 1	4	09 Nov 06	Safety PCB component side copper
TRP-1663-CD	1 of 1	8	09 Nov 06	Biased toxic schematic
TRP-1688-A3	1 of 1	8	09 Nov 06	Biased toxic PCB artwork
TRP-2317-CD	1 of 1	5	09 Nov 06	TCS PCB schematic
TRP-3638-CD	1 of 1	1	09 Nov 06	Sounder PCB schematic
TRP-3639-CL	1 of 1	1	09 Nov 06	Sounder PCB silkscreen
TRP-3639-PCA	1 of 1	1	09 Nov 06	Sounder PCB component side copper
TRP-3639-PCB	1 of 1	1	09 Nov 06	Sounder PCB solder side copper
TRP-3665-A3	1 of 1	1	09 Nov 06	Thermal conductivity sensor artwork
TRP-3669-A3	1 of 1	1	09 Nov 06	Tripleplus + DCP 2114 Detail
TRPP-3633-A1	1 to 2	1	09 Nov 06	General arrangement
TRPP-3652-A3	1 of 1	1	09 Nov 06	Block diagram
TRPP-3653-A4	1 to 3	11	09 Nov 06	Critical parts list

Issue 3

Drawing no.	Sheets	Rev.	Date	Title
TRP-1640-CD	1 of 1	10	04 Sep 09	Oxygen PCB schematic

Issue 4

Drawing no.	Sheets	Rev.	Date	Title
2298	1 of 1	1	Oct 09	Battery pack cover label – old units
2299	1 of 1	1	Oct 09	Battery pack cover label – new units
40266-300	1 to 3	F	29 Oct 09	Battery pack internal assembly
40266-500	1 of 1	A	30 Oct 09*	Battery pack inner PCB schematic
40266-501	1 of 1	B	30 Oct 09*	Battery pack top PCB schematic
40266-503**	1 to 4	A	30 Oct 09*	Battery pack inner PCB artwork
TRP-3657-A4	1 of 1	4	Oct 09	Certification label

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Certificate Annexe

Certificate Number: **Sira 02ATEX2176X**

Equipment: **Triple Plus+**

Applicant: **Crowcon Detection Instruments Ltd**

Drawing no.	Sheets	Rev.	Date	Title
TRPP-3633-A1	1 to 2	2	Oct 09	General arrangement
TRPP-3652-A3	1 of 1	2	Oct 09	Block diagram
TRPP-3653-A4	1 to 3	12	Oct 09	Critical parts list

* Sira stamp date

** Sheet numbering added by Sira

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1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 02ATEX2176X** Issue: **3**

4 Equipment: **Triple Plus+**

5 Applicant: **Crowcon Detection Instruments Ltd**

6 Address: Blacklands Way
Abingdon
OX14 1DY
UK

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:

IEC 60079-0:2000 IEC 60079-1:2003 IEC 60079-11:1999

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:

II 2 G
Ex ib d IIC T4
T_a = -20°C to +50°C

Project Number 52L21051
C. Index 14

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE **Sira 02ATEX2176X**
Issue 3

13 **DESCRIPTION OF EQUIPMENT**

The Triple Plus+ gas detector, which may also be called a Tank-Mate or a Gaseeker, is a portable battery-powered instrument comprising the following principal sub-assemblies:

1. Nominally 6 V lead-acid battery mounted in a separate compartment
2. Triple Plus main board with an LCD on its own separate PCB mounted piggy-back to the underside – the assembly is mounted in the lid
3. Safety PCB
4. Sounder PCB and sounder
5. Up to four sensor modules

The sensor modules may be chosen from the following:

- Oxygen
- Toxic
- Biased Toxic
- Flammable
- Thermal Conductivity
- Infra-Red

The modules may be used in any combination but with a maximum of one IR module.

The circuitry is housed in an enclosure manufactured from a non-conducting plastics material, with a separate compartment for the lead-acid battery. The cover incorporates a number of pushbuttons and LEDs, it also has a window to allow viewing of the liquid crystal display. A piezo-electric alarm buzzer is incorporated into the device.

No external electrical connections are permitted while the equipment is in the hazardous area. Charging of the battery is only permitted in the non-hazardous area and the permissible battery types are:

- Yuasa NP1.2
- Yuasa IBT BT1
- Sonnenschein A506 1.25

Variation 1 - This variation introduced the following change:

i. To recognise modifications to the oxygen sensor PCB.

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE **Sira 02ATEX2176X**
Issue 3

14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Sira Reports and Certificate History**

Issue	Date	Report number	Comment
0	24 December 2002	R52A9131A	The release of the prime certificate.
1	15 October 2003	R52A9131B	Re-issued to include variation 1 dated 16 January 2003 and to permit report number R52A9131A to be replaced by report number R52A9131B.
2	16 February 2007	R52L15432B	Re-issued to Introduce the changes described in report number R52L15432B, this involves incorporating variations 1 to 9 dated 23 February 2004, 23 February 2004, 17 August 2004, 10 February 2005, 9 May 2005, 7 October 2005, 11 October 2005, 14 October 2005 and 23 May 2006 respectively
3	7 October 2009	R52L21051A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 3, Issues 0 to 2 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. • The introduction of Variation 1.

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

15.1 If the Triple Plus+ is used in the gases associated with apparatus groups IIC (i.e. hydrogen, acetylene or carbon disulphide), it shall be used such that the risk of mechanical impact to the enclosure is low.

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 following sub-assemblies covered by certification drawings to the previous production issues may also be used in the Triple Plus+:

- Oxygen Module Board
- Toxic Module Board
- Bias Toxic Module Board
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- Thermal Conductivity Module Board
- Infra-Red Module

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Certificate Annexe

Certificate Number: **Sira 02ATEX2176X**

Equipment: **Triple Plus+**

Applicant: **Crowcon Detection Instruments Ltd**

Issues 0 to 1 The drawings listed with these Issues were rationalised and have been superseded by those detailed in Issue 2.

Issue 2

Number	Sheet	Rev.	Date (Sira stamp)	Title
IRSM-5152-A3	1 of 1	2	09 Nov 06	IR PCB schematic
P-5109-A4	1 of 1	1	09 Nov 06	Fuse encapsulation details
P-5620-A2	1 of 1	1	09 Nov 06	Membrane keypad detail
TRP-3657-A4	1 of 1	3	15 Feb 07	Certification label
TRP-1630-CL	1 of 1	9	09 Nov 06	Main PCB Silk Screen
TRP-1630-PCA	1 of 1	9	09 Nov 06	Main PCB layer 1 artwork
TRP-1630-PCB	1 of 1	9	09 Nov 06	Main PCB layer 2 artwork
TRP-1630-PCC	1 of 1	9	09 Nov 06	Main PCB layer 3 artwork
TRP-1630-PCD	1 of 1	9	09 Nov 06	Main PCB layer 4 artwork
TRP-1636-CD	1 of 1	12	09 Nov 06	Main PCB schematic
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TRP-1639-CD	1 of 1	6	09 Nov 06	Toxic PCB schematic
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TRP-1658-PCA	1 of 1	4	09 Nov 06	Safety PCB solder side copper
TRP-1658-PCB	1 of 1	4	09 Nov 06	Safety PCB component side copper
TRP-1663-CD	1 of 1	8	09 Nov 06	Biased toxic schematic
TRP-1688-A3	1 of 1	8	09 Nov 06	Biased toxic PCB artwork
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TRP-3665-A3	1 of 1	1	09 Nov 06	Thermal conductivity sensor artwork
TRP-3669-A3	1 of 1	1	09 Nov 06	Tripleplus + DCP 2114 Detail
TRPP-3633-A1	1 to 2	1	09 Nov 06	General arrangement
TRPP-3652-A3	1 of 1	1	09 Nov 06	Block diagram
TRPP-3653-A4	1 to 3	11	09 Nov 06	Critical parts list

Issue 3

Drawing no.	Sheets	Rev.	Date	Title
TRP-1640-CD	1 of 1	10	04 Sep 09	Oxygen PCB schematic

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1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: Sira 02ATEX2176X

4 Equipment: Triple Plus+

5 Applicant: Crowcon Detection Instruments Ltd

6 Address: 2 Blacklands Way
Abingdon
OX14 1DY
UK

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 confidential report numbers R52A9131B and R52L15432B.

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:

IEC 60079-0:2000
IEC 60079-1:2003
IEC 60079-11:1999

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:


II 2 G
Ex ib d IIC T4
T_a = -20°C to +50°C

Project Number 52L15432
Date 24 December 2002
Latest Issue 16 February 2007
C. Index 14

C Ellaby
Certification Officer

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 02ATEX2176X

Re-issued 15 October 2003 to include variation 1 dated 16 January 2003 and to permit report number R52A9131A to be replaced by report number R52A9131B.
Re-issued 16 February 2007 to Introduce the changes described in report number R52L15432B, this involves incorporating variations 1 to 9 dated 23 February 2004, 23 February 2004, 17 August 2004, 10 February 2005, 9 May 2005, 7 October 2005, 11 October 2005, 14 October 2005 and 23 May 2006 repectively.

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1. Nominally 6 V lead-acid battery mounted in a separate compartment
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4. Sounder PCB and sounder
5. Up to four sensor modules

The sensor modules may be chosen from the following:

- Oxygen
- Toxic
- Biased Toxic
- Flammable
- Thermal Conductivity
- Infra-Red

The modules may be used in any combination but with a maximum of one IR module.

The circuitry is housed in an enclosure manufactured from a non-conducting plastics material, with a separate compartment for the lead-acid battery. The cover incorporates a number of pushbuttons and LEDs, it also has a window to allow viewing of the liquid crystal display. A piezo-electric alarm buzzer is incorporated into the device.

No external electrical connections are permitted while the equipment is in the hazardous area. Charging of the battery is only permitted in the non-hazardous area and the permissible battery types are:

- Yuasa NP1.2
- Yuasa IBT BT1
- Sonnenschein A506 1.25

14 **DESCRIPTIVE DOCUMENTS**

14.1 Drawing

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TRP-1630-PCC	1 of 1	9	09 Nov 06	Main PCB layer 3 artwork
TRP-1630-PCD	1 of 1	9	09 Nov 06	Main PCB layer 4 artwork
TRP-1636-CD	1 of 1	12	09 Nov 06	Main PCB schematic
TRP-1637-CD	1 of 1	9	09 Nov 06	Safety PCB schematic

Date 24 December 2002
Latest Issue 16 February 2007

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE Sira 02ATEX2176X

Number	Sheet	Rev.	Date (Sira stamp)	Description
TRP-1638-CD	1 of 2	5	09 Nov 06	Flammable PCB schematic
TRP-1639-CD	1 of 1	6	09 Nov 06	Toxic PCB schematic
TRP-1640-CD	1 of 1	8	09 Nov 06	Oxygen PCB schematic
TRP-1658-CPL	1 of 1	4	09 Nov 06	Safety PCB silkscreen
TRP-1658-PCA	1 of 1	4	09 Nov 06	Safety PCB solder side copper
TRP-1658-PCB	1 of 1	4	09 Nov 06	Safety PCB component side copper
TRP-1663-CD	1 of 1	8	09 Nov 06	Biased toxic schematic
TRP-1688-A3	1 of 1	8	09 Nov 06	Biased toxic PCB artwork
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TRP-3638-CD	1 of 1	1	09 Nov 06	Sounder PCB schematic
TRP-3639-CL	1 of 1	1	09 Nov 06	Sounder PCB silkscreen
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TRPP-3652-A3	1 of 1	1	09 Nov 06	Block diagram
TRPP-3653-A4	1 to 3	11	09 Nov 06	Critical parts list

14.2 Report number R52A9131B and R52L15432B.

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15.1 If the Triple Plus+ is used in the gases associated with apparatus groups IIC (i.e. hydrogen, acetylene or carbon disulphide), it shall be used such that the risk of mechanical impact to the enclosure is low.

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The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in report number R52A9131B and R52L15432B.

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- Toxic Module Board
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- Thermal Conductivity Module Board
- Infra-Red Module

Date 24 December 2002
Latest Issue 16 February 2007

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