1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 06ATEX2036X** Issue: **3**

4 Equipment: **STX3261 Methane Sensor**

5 Applicant: **Trolex Ltd**

6 Address: Newby Road
Hazel Grove
Stockport
SK7 5DY
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:

EN 50014:1997 (amendments A1 to A2) EN 50020:2002 EN 50303:2000

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:

I M1
EEx ia I (T_{amb} = -20°C to +55°C)

Project Number 59A19227
C. Index 14

C Ellaby
Certification Officer

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE **Sira 06ATEX2036X**
Issue 3

13 **DESCRIPTION OF EQUIPMENT**

The Methane Sensor is designed to measure methane concentration by means of a pellistor type sensing head and to electronically convert the measured methane concentration into an output signal that can be configured either as a 0 V to 2.0 V output signal or as a 4 to 20 mA output signal.

The unit consists of a controller PCB, an output PCB containing an encapsulated DC to DC converter and an optional LCD, all located in a plastic enclosure having an ingress protection rating of at least IP54. A window in the outer enclosure permits local viewing of the Methane concentration displayed on the optional LCD. A relay mounted on the controller PCB is programmed to disconnect the power to the catalytic sensor. The catalytic sensor is housed in a separate metallic enclosure that is externally attached to the main plastic enclosure. External electrical connections are made to screw type terminals mounted on the output PCB.

The STX3261 Methane Sensor has the following safety description:

Connector pins 1 w.r.t. 2 (Power input)	Connector pins 4 w.r.t. 3 (0.4 to 2V signal output)	Connector pins 5 w.r.t. 3 (4-20mA signal output)
Ui = 15.4 V Ii = 3.14 A Li = 0 Ci = 0	Uo = 6.51 V Io = 31.2 mA Po = 21.5 mW Co = 1000 µF Ci = 0 Lo = 0.5 H Ui = 15.4 V	Uo = 15.4 V Io = 162.1 mA Po = 62.5 mW Co = 12.8 µF Ci = 121nF/132.46 µF @ 6.51 V Lo = 17.7 mH Ui = 15.4 V

This certificate does not cover any accessories to the methane sensor or its incorporation into an intrinsically safe system.

Variation 1: This variation introduced the following changes:

i. The name and address of the applicant was changed.
ii. The input voltage (U_i) at connector T1 w.r.t T2 and T4 w.r.t. T3 is now 14.4 V (previously 15.4 V).
iii. The input fuse F1 is now 0.125 mA (was 250 mA).
iv. The 2 V Pellister power supply (DC to DC converter) is now part of the output printed circuit board (pcb) and is now un-encapsulated.
v. The DC to DC converter has been re-designed. The clamped output voltage to the pellister has remained 3.47 V (maximum). The inductor value L1 in the modified DC to DC converter is 12 µH (previously 470 µH).
vi. The 5 V power rail is now clamped by ZD1 & ZD2 to 7.14 V (previously D2, D3 & D4 clamped to 6.51 V).
vii. The output board now has two build options. It is built to give either an output of 0.4 V - 2 V or 4 – 20 mA at terminal 4.
viii. The circuit to the 4 – 20 mA output is now supplied from the 12 V rail (14.4 V = U_i).
ix. The relay, used to disconnect the power to the catalytic sensor, is no longer used.
x. The output pcb is now made up using four layers.
xi. Minor circuit modifications have also been made to the LCD board, these do not affect intrinsic safety assessment.

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xii. The recognition of the new safety parameters listed below, when incorporating the changes described in this variation:

Connector pins T1 w.r.t. T2 (Power input)	Connector pins T4 w.r.t. T3 (0.4 - 2 V signal output)	Connector pins T4 w.r.t. T3 (4 - 20 mA signal output)
Ui = 14.4 V Ii = 3.14 A Li = 0 Ci = 0	Uo = 7.14 V Io = 12 mA Po = 22 mW Ci = 0 Li = 0 Co = 1000 µF Lo = 1 H Ui = 14.4 V	Uo = 14.4 V Io = 276 mA Po = 1 W Ci = 0 Li = 0 Co = 17.9 µF Lo = 6.13 mH Ui = 14.4 V

Variation 1 - This variation introduced the following changes:

i. The addition of interconnection details between the Head and the printed circuit board.
ii. To permit the use of an alternative Head arrangement for the methane sensor.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	17 February 2006	R52F13818A	The release of prime certificate.
1	6 June 2007	R59A16388A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 1. Issue 0 referenced above is only intended to reflect the history of the previous certification and has not been issued as a document in this format. • The introduction of Variation 1.
2	4 September 2007	R59A16388B	This issue recognised that report number R59A16388B replaced R59A16388A.
3	7 April 2009	R59A19227A	The introduction of Variation 2.

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

15.1 The IP54 rating of the unit shall be maintained at all times.

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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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE **Sira 06ATEX2036X**
Issue 3

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 permitted catalytic gas sensors are:

Either: a pair of Type VQ2 manufactured by e2v Technologies
or: a pair of Type SX1 manufactured by Dynament Limited

17.4 The permitted metal housing for the catalytic gas sensors is the cylindrical housing shown on certified drawing numbers P5156.59 Issue D dated 25 May 1997 and J.5007.12.01 Issue A dated 16 Nov 2005.

17.5 For Group I equipment, no labels or similar items shall be affixed directly onto electrical parts or tracks of a printed circuit board. This is to avoid overheating which may give rise to an ignition hazard.

17.6 This certificate relies on the following previously certified products. When used as part of the Methane Sensor, the key attributes listed in the table below shall still be maintained by their original certificate.

Description	Certificate No.	Key attribute
Littelfuse type 259 Series Safe-T-Plus Safety Fuse	Baseefa 02ATEX0071U	Ex II 1G EEx

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Certificate Annexe

Certificate Number: **Sira 06ATEX2036X**

Equipment: **STX3261 Methane Sensor**

Applicant: **Trolex SA (Pty) Ltd**

sira CERTIFICATION

Issue 0

Drawing No.	Sheets	Rev.	Date	Description
J5007.01.01	1 of 1	A	23 Feb 05	Circuit Diagram DC to DC converter
J5007_01_02	1 of 1	A	31 Mar 05	Circuit Diagram Output PCB
J5007.06.02	1 of 1	A	23 Feb 05	Circuit Diagram Controller PCB
J5007_01_04	1 of 1	A	18 Nov 05	LCD PCB / LCD for controller
J5007_03_02	1 of 1	A	18 Nov 05	Component and track layout – Output PCB
J5007_03_03	1 of 1	A	16 Nov 05	Component and track layout – Controller PCB
J5007_11_01	1 of 1	A	23 Feb 05	Component and track layout – SXT3261_PSU
J5007_11_02	1 of 1	A	16 Nov 05	Label details
J5007.12.01	1 of 1	A	16 Nov 05	Assembly drawing – Full assembly of unit
J5007.12.02	1 of 1	A	16 Nov 05	Assembly drawing – Internal assembly
P5156.59	1 of 1	D	23 May 97	Arrangement of Sensor Head

Issue 1

Drawing No.	Sheets	Rev.	Date	Description
P5555.15	1 of 1	A	09 Mar 07	Block Diagram
P5555.01	1 of 3	A	30 Apr 07	Circuit Diagram Output PCB
P5555.01	2 of 3	A	30 Apr 07	Circuit Diagram Output PCB
P5555.01	3 of 3	A	08 Mar 07	Circuit Diagram Output PCB
P5555.03	1 of 1	A	30 Apr 07	Output PCB
P5555.05	1 of 2	A	08 Mar 07	Circuit Diagram Control & Display
P5555.05	2 of 2	A	08 Mar 07	Parts List Control & Display
P5555.04	1 of 1	A	17 Jan 07	PCB Control & Display
P5555-02	1 of 1	A	15 Mar 07	General Arrangement
P5555-17	1 of 1	A	24 May 07	Certification Label

Issue 2

No new drawings were introduced.

Issue 3

Drawing No.	Sheets	Rev.	Date (Sira Stamp)	Description
P5555-02	1 of 2	A	30 Mar 09	General Arrangement
P5555-02	2 of 2	A	30 Mar 09	GA Alternative Head Arrangement

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