Certification Service

1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: Sira 99ATEX2135X

4 Equipment: TX592x Vortex Gas Flow Sensor/Transmitter

5 Applicant: Trolex Limited

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 confidential report number R52X6307A.

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
EN 50020:1994
EN 50284:1999

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment or protective system 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 M 1 EEx ia I (T_a = -20°C to +60°C) or

II 1 G EEx ia IIC T4 (T_a = -20°C to +60°C)

Project Number 52X6307
Date 19 April 2000
C. Index 12

M D Shearman
Certification Manager

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SCHEDULE

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13 **DESCRIPTION OF EQUIPMENT**

The TX592x-Series Vortex Gas Flow Sensor/Transmitters comprise three PCBs housed in a polycarbonate or zinc alloy enclosure; both types of enclosure have a polycarbonate window bonded into a recess to allow viewing of the liquid crystal display mounted on the control PCB. The Vortex Gas Flow Sensor, which projects from the enclosure or is mounted remotely via a flying lead, comprises a single PCB in a stainless steel cylindrical case.

There are three types of Sensor/Transmitters:

1 TX5921: rear-projecting sensor
2 TX5922: side-projecting sensor
3 TX5923: remote sensor

Each of these types may be manufactured in one of four versions:

A Group I: 4 to 20 mA version
B Group I: 0.4 to 2 V version
C Group I: 5 to 15 Hz version
D Group II: 4 to 20 mA version

The supply to the equipment is via terminals T3 and T4. The equipment is designed to detect the rate of gas flow by creating a stream of vortices, through which an ultrasonic beam is passed. The received signal, which is modulated by the vortex stream, is then converted into an output at terminals T1 and T2.

The TX5921/2/3 have the following safety descriptions:

Version	T3/T4 (supply)	T1/T2 (signal out) [See notes 1-3]
Group I: 4 - 20 mA version	U_i = 16.5 V; C_i = 4 nF; L_i = 0	U_i = 16.5 V P_i = 1.72 W C_i = 15 nF; L_i = 0. U_o = 16.5 V; I_o = 220 mA P_o = 0.91 W C_o = 11.9 µF; L_o = 2.6 mH.
Group I: 0.4 - 2 V version	U_i = 16.5 V; C_i = 4 nF; L_i = 0	U_i = 16.5 V P_i = 1.72 W C_i = 15 nF; L_i = 0 U_o = 16.5 V; I_o = 41 mA P_o = 0.17 W C_o = 11.9 µF; L_o = 2.6 mH
Group I: 5-15 Hz version	U_i = 16.5 V; C_i = 4 nF; L_i = 0	U_i = 16.5 V P_i = 1.72 W C_i = 0; L_i = 0 U_o = 0

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Version	T1/T2/T3/T4 (total inputs to 'supply' and 'signal out')
Group II 4 - 20 mA version:	U_i = 28 V; I_i = 120 mA P_i = 0.84 W C_i = 18.3 nF; L_i = 0

Note 1: In some applications, T1 and T2 are inputs, in which case these output parameters are not relevant.

Note 2: For Group I builds, the connections to terminals T1/T2 and T3/T4 shall be from the same power supply. The user should note that the power to terminals T1/T2 must be limited to 1.72 W via a supply with a minimum source resistance of 40 Ω. There is no specific power limitation to terminals T3/T4, so terminals T1/T2 and T3/T4 should be regarded as separate intrinsically safe circuits.

Note 3: The user should refer to the parameters of the equipment connected to terminals T1/T2 and compare these to the parameters listed in the table. The more onerous set of parameters should be used.

Note 4: Terminals T5, T6 and T8 are connections to the Vortex Head which may be integral with the main part of the apparatus (TX5921 and TX5922) or connected by a cable not exceeding 10 m in length (TX5923). T7 is not connected.

The equipment has not been assessed as a 'safety device' as referenced in Directive 94/9/EC, Annex II, clause 1.5.

14 **DESCRIPTIVE DOCUMENTS**

14.1

Drawing No.	Sheets	Rev.	Date	Description
P5430.01	1 of 1	A	03 Nov 97	Control PCB Certified Circuit Diagram
P5430.04	1 of 1	A	22 Jan 98	Output PCB
P5431.01	1 of 1	B	05 Apr 00	Output PCB Certified Circuit Diagram
P5431.02	1 of 1	B	15 Mar 00	General Arrangement
P5431.03	1 of 4	C	05 Apr 00	Top side component map
P5431.03	2 of 4	C	05 Apr 00	Top Side Tracking
P5431.03	3 of 4	C	05 Apr 00	Bottom Side Tracking
P5431.03	4 of 4	C	05 Apr 00	Bottom side component map
P5431.37	1 of 1	C	05 Apr 00	Head PCB Certified Circuit Diagram
P5431.42	1 of 1	A	16 Jan 98	Certified Block Diagram
P5431.88	1 of 1	A	22 Mar 00	Certification Label
P9000.100	1 of 1	B	06 Apr 00	Alternative Housing Arrangement

14.2 Report No. R52X6307A

Date 19 April 2000

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SCHEDULE

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

15.1 The only sensor that may be used with the TX5923 (remote sensor head version) is that supplied by Trolex. The maximum length of cable allowed is 10 m.

15.2 The polycarbonate enclosure (if applicable) and the polycarbonate window are non-conducting and may generate an ignition-capable level of static under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high-pressure steam) which might cause a build-up of static on non-conducting surfaces. *Additionally, cleaning of the equipment should be done only with a damp cloth.*

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSR'S)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in Report No. R52X6307A.

17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of SCS Certificates.

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

Product	Certificate number	Key attributes
Littelfuse fuse	BAS Ex 832302U	EEx ia IIC
Bedford OPI1264-series opto-isolator	BAS Ex 89C2096U/2	EEx ia IIC

Date 19 April 2000

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EC TYPE-EXAMINATION CERTIFICATE VARIATION

CERTIFICATE NUMBER	Sira 99ATEX2135X	Dated	19 April 2000
VARIATION NUMBER	1 (ONE)	Dated	16 November 2000

VARIATION TO EQUIPMENT

To permit:

1 The use of pad printing as an alternative method of marking.

DESCRIPTIVE DOCUMENTS

Number	Sheet	Rev	Date	Description
P9000.100	1 of 1	C	7 Jun 00	Alternative Housing Arrangement

ADDITIONAL CONDITIONS OF CERTIFICATION

None

File No. 52V6965

Report No. NA

R Cooper IEng LInstMC
Deputy Chief Executive

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EC TYPE-EXAMINATION CERTIFICATE VARIATION

CERTIFICATE NUMBER	Sira 99ATEX2135X	Dated	19 April 2000
VARIATION NUMBER	2 (TWO)	Dated	20 February 2002

VARIATION TO EQUIPMENT

To permit:

1 The addition of a potentiometer to the sensor head circuit.

DESCRIPTIVE DOCUMENTS

Number	Sheet	Rev	Date	Description
P5431.37	1 of 1	D	28 Jan 02	Schematic – head PCB
P5431.03	1 of 1	D	28 Jan 02	Artwork – head PCB
P5431.02	1 of 1	C	19 Dec 00	General Arrangement

ADDITIONAL CONDITIONS OF CERTIFICATION

None

File No 52A8653

Report No. R52A8653A

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EC TYPE-EXAMINATION CERTIFICATE VARIATION

CERTIFICATE NUMBER	Sira 99ATEX2135X	Dated	19 April 2000
VARIATION NUMBER	3 (THREE)	Dated	17 September 2002

VARIATION TO EQUIPMENT

To permit:

1 The increase in value of C26 from 2.64 nF to 12 nF.

DESCRIPTIVE DOCUMENTS

Number	Sheet	Rev	Date	Description
P5431.01	1 of 1	C	04 Sep 02	Output PCB Certified Circuit Diagram

ADDITIONAL CONDITIONS OF CERTIFICATION

None

File No 52V9493

Report No. NA

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EC TYPE-EXAMINATION CERTIFICATE VARIATION

CERTIFICATE NUMBER	Sira 99ATEX2135X	Dated	19 April 2000
VARIATION NUMBER	4 (FOUR)	Dated	24 March 2003

VARIATION TO EQUIPMENT

To permit:

1 The use of 'Faradex' stainless steel filled nylon 6 as an alternative anti-static enclosure material.

DESCRIPTIVE DOCUMENTS

Number	Sheet	Rev	Date	Description
P5431.02	1 of 1	D	06 Feb 03	General arrangement

ADDITIONAL CONDITIONS OF CERTIFICATION

None

File No 52A9400

Report No. R52A9400A

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EC TYPE-EXAMINATION CERTIFICATE VARIATION

CERTIFICATE NUMBER	Sira 99ATEX2135X	Dated	19 April 2000
VARIATION NUMBER	5 (FIVE)	Dated	14 May 2003

VARIATION TO EQUIPMENT

To permit:

1 The value of C26 in the 4-20 mA Group I build to be increased from 2.64nF to 12 nF.

DESCRIPTIVE DOCUMENTS

Number	Sheet	Rev	Date	Description
P5431.01	1 of 1	D	04 Mar 03	Output PCB Certified Circuit Diagram

ADDITIONAL CONDITIONS OF CERTIFICATION

None

File No 52V10187

Report No. NA

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EC TYPE-EXAMINATION CERTIFICATE VARIATION

CERTIFICATE NUMBER	Sira 99ATEX2135X	Dated	19 April 2000
VARIATION NUMBER	6 (SIX)	Dated	3 May 2006

VARIATION TO EQUIPMENT

To permit:

1 The mechanical design of the head to be varied as required.

DESCRIPTIVE DOCUMENTS

Number	Sheet	Rev	Date	Description
P5431.02	1 of 1	E	17 Jan 06	General Assembly

ADDITIONAL CONDITIONS OF CERTIFICATION

None

File No. 52V14453

Report No. R52V14453A

Form 9206 Issue 3

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