





Mining And Surface Certification (Pty) Ltd

2015/021934/07

THIS CERTIFICATE IS ISSUED AS AN I.A. CERTIFICATE IN TERMS OF THE MINE HEALTH AND SAFETY ACT, ACT NO 29 OF 1996 (AND REGULATIONS), THE OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993) AND REGULATION 17 OF THE ELECTRICAL MACHINERY REGULATIONS

IA CERTIFICATE	MASC MS/25-8220X	Issue	0
Issue Date	28 May 2025	Expiry Date	28 May 2028
** Based on Certificate No	Sira 99ATEX2135X	Issue / Variations / Amendment	8
Requested by	Trox Limited 10a Newby Road, Hazel Grove Stockport SK7 5DY, United Kingdom		
Manufacturer	Trox Limited Hazel Grove, Stockport, Cheshire, SK7 5DY, U.K		
Description	The TX592x-Series Vortex Gas Flow Sensor/Transmitters comprise three PCBs housed in an anti-static plastic enclosure. A polycarbonate window is fitted to allow viewing of the liquid crystal display. 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. See Base Certificate** for further description.		
Equipment	Vortex Gas Flow Sensor/Transmitter	Type	TX592x
MARKING: Original marking as per certificate ** remains applicable. IA number must be added.	Type:	TX592x Vortex Gas Flow Sensor/Transmitter	
	Ex Marking:	Ex ia I Ma Ta = -20°C to +60°C OR Ex ia IIC Ga T4 Ta = -20°C to +60°C	
	IA Number:	MASC MS/25-8220X (To be additionally marked on equipment)	
	Warnings:	See Base Certificate ** (original marking must be applied)	
Quality Assurance report (QAR) / Notification (QAN):	"It is a requirement under ATEX that all equipment for category 1 and 2 areas must have 3rd party quality assurance from a notified body. This is accepted to cover the equipment's quality requirements."		
Compliance: The equipment as described above has been allocated the rating <u>Explosion Protected 'as above'</u> utilizing the SANS/IEC Standards: <ul style="list-style-type: none"> • SANS (IEC) 60079-0: 2019 Equipment - General requirements • SANS (IEC) 60079-11: 2012 Equipment protection by intrinsic safety "i" • SANS (IEC) 60079-26: 2007 Equipment with equipment protection level (EPL) Ga <i>Note: This certificate covers only the listed standards and does not imply compliance to any other standard, related or inferred. It is up to the manufacturer to ensure that the product complies to all relevant standards for the application.</i>			
Specific conditions of use "X": <ul style="list-style-type: none"> • Refer to Annex A below for more details. 			
Conditions of manufacture: <ul style="list-style-type: none"> • Refer to Annex A below for more details. 			
 S. JORDAAN TECHNICAL SPECIALIST		 N. VILOJEN TECHNICAL OFFICER	
<small>This certificate covers all units sold as long as the QAR/QAN remains valid. According to the relevant requirements of the MHS Act and the OHS Act, production units of explosion protected equipment are required to comply with third party quality assurance (an approved mark scheme or batch testing by an accredited test laboratory).</small>			

Apparatus in hazardous locations is subject to the following provisions as applicable, which shall be adhered to:
SANS 10086 requirements;
Any conditions mentioned in the above certificate;
Any relevant requirements of the MHS Act;
Any restrictions and conditions enforced by the chief inspector of mines, principal inspector (Group I equipment) or chief inspector of factories (Group II equipment).

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The certificate is not transferable and remains the property of the issuing body.

IA CERTIFICATE: MASC MS/25-8220X
Equipment: TX592x Vortex Gas Flow Sensor/Transmitter
(Expiry date: 28 May 2028)

ANNEX A

This document is based on and must be read in conjunction with certificate Sira 99ATEX2135X.	
Description (According to Base Certificate) **	
"Refer to description in Base Certificate ** (and any applicable schedules/issues/variations)."	
Supplementary	Issue 0: Supplemented for new IA number based on MASC MS/13-188X.
Standard compliance	See Base Certificate **
Specific conditions of use ("X")	<ul style="list-style-type: none"> 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. The plastic enclosure 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.
Conditions of manufacture	<ul style="list-style-type: none"> None.
Conditions of Certification	<ul style="list-style-type: none"> This IA Certificate covers all units sold from the date of this document to the expiry date of this certificate. As per ARP 0108: 2018 / NCoP 2398: 2022 (as applicable) a maximum three yearly review is required on this IA Certificate (expiry is determined as per the QAR/QAN/QMS expiry date). The apparatus must be additionally marked with the MASC marking details above. This approval only covers the equipment as certified above and does not include any scheduled additions or variations / amendments / new issues to the certificate(s), made after the above date. The equipment does not need to be re-tested when used on the conditions and with such restrictions as prescribed by the certificate on which this IA Certificate is based and any other conditions in this IA Certificate. The certification on which this IA Certificate is based must remain valid. The extent of the requirements in the ARP 0108:2018 / NCoP 2398: 2022 (as applicable), SANS 10108 and any other applicable regulations on the certification of the equipment must remain unchanged. The Ex-quality assurance notification/report for the equipment must remain valid.
Conclusion:	<ul style="list-style-type: none"> From the above and the selective examination of the documentation, nothing contrary to the requirements of the applicable standards was found, provided that the equipment / component is used as described in the above document / certificate and according to the MASC conditions below. A MASC IA certificate is issued based on the work done as per the Base Certificate **. The routine tests for production units according to the Base Certificate ** must be complied with (if applicable).

This document is issued based on Mining And Surface Certification's Standard Contract terms and conditions available on request.

While every endeavour is made to ensure that a test / assessment / inspection is representative and accurately performed, and that a report / certificate is accurate in the quoted results and conclusions drawn from the test / assessment / inspection, MASC or its directors/employees shall in no way be liable for any error made in carrying out the test / assessment or for any erroneous statement, whether in fact or in opinion, contained in a report / certificate issued pursuant to a test / assessment / inspection.

MASC takes no responsibility for any non-conformances, exclusions, or any results / assessments / inspections not in compliance with the standards. By marking the equipment in accordance with the documentation / standard, the manufacturer / applicant attests on his own responsibility that the equipment / installation has been designed and constructed in accordance with the applicable requirements of the relevant standards and documentation, that the routine verifications / routine tests have been correctly completed and the equipment / installation complies with the documentation and standard(s).

This document is only for use and application in South Africa. It is issued based on National interpretations and accepted practices.

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This certificate is not transferable and remains the property of the issuing body.
This document will not be supported by MASC for certification purposes outside the borders of South Africa.

Mining And Surface Certification (Pty) Ltd Reg No: 2015/021934/07
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1 **EU-TYPE EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

3 Certificate Number: **Sira 99ATEX2135X** Issue: **8**

4 Equipment: **TX592x Vortex Gas Flow Sensor/Transmitter**

5 Applicant: **Trolex Limited**

6 Address: Hazel Grove
Stockport
Cheshire
SK7 5DY
U.K.

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

8 CSA Group Netherlands B.V., Notified Body Number 2813 in accordance with Articles 17 and 21 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, 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 60079-0:2011 EN 60079-11:2012 EN 60079-26:2007 EN 50303:2000

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to Specific Conditions of Use identified in the schedule to this certificate.

11 This EU-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
Ex ia I Ma
Ta = -20°C to +60°C

or  II 1G
Ex ia IIC Ga T4
Ta = -20°C to +60°C

Project Number 2377

Signed: 

Title: Director of Operations

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CSA Group Netherlands B.V.
Utrechtseweg 310,
6812 AR, Arnhem,
Netherlands



SCHEDULE

EU-TYPE EXAMINATION CERTIFICATE

Sira 99ATEX2135X
Issue 8

13 DESCRIPTION OF EQUIPMENT

The TX592x-Series Vortex Gas Flow Sensor/Transmitters comprise three PCBs housed in an anti-static plastic enclosure. A polycarbonate window is fitted to allow viewing of the liquid crystal display. 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:

- TX5921: rear-projecting sensor
- TX5922: side-projecting sensor
- TX5923: remote sensor

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

- Group I: 4 to 20 mA version
- Group I: 0.4 to 2 V version
- Group I: 5 to 15 Hz version
- 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
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	



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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.

TX-592x-Series Vortex Sensing Head

The TX592x Vortex Gas Flow Sensor Remote Head is a stand-alone item of apparatus designed to be powered from a suitable barrier or isolator, or alternatively via a sensor/transmitter. The Vortex Head comprises a single PCB in a stainless steel cylindrical case. The apparatus 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 is modulated by the vortex stream.

There are two types of Sensing Heads:

- 1 TX5924: hand-held
- 2 TX5925: fixed-mount

Both of these types are manufactured for Group I and Group II applications. The construction of the Group I and Group II versions is identical. The Vortex Head has the following safety description:

Group I (total of supply plus signal)	Group II (total of supply plus signal)
U _i = 16.5 V	U _i = 30 V
I _i = 390 mA	I _i = 390 mA
P _i = 1.61 W	P _i = 1.2 W
C _i = 0	C _i = 0
L _i = 15 μH	L _i = 15 μH

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

Variation 1 - This variation introduced the following changes:

- i. The use of pad printing was recognised as an alternative method of marking.

Variation 2 - This variation introduced the following changes:

- i. A potentiometer was added to the sensor head circuit.

Variation 3 - This variation introduced the following changes:



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- i. The value of C26 was reased from 2.64 nF to 12 nF.

Variation 4 - This variation introduced the following changes:

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

Variation 5 - This variation introduced the following changes:

- i. To permit the value of C26 in the 4-20 mA Group I build to be reased from 2.64nF to 12 nF.

Variation 6 - This variation introduced the following changes:

- i. The mechanical design of the head was varied as required.

Variation 7 - This variation introduced the following changes:

- i. To recognise that the equipment complies with IEC 60079-0:2011, EN 60079-11:2012, EN 60079-26:2007 & EN 50303:2000. The list of standards is updated accordingly.
- ii. The addition of an alternative plastic enclosure material with anti-static properties.
- iii. The deletion of the z alloy enclosure option.
- iv. The marking details are now laser-etched on a stainless steel label and is attached to the front face of the apparatus.
- v. The use of Bedford opto-isolator Type OPI1264D approved under BAS 01ATEX1278U/4 coded Ex ia IIC Ga as a replacement to that approved under BAS Ex 89C2096U/2 coded EEx ia IIC.
- vi. The use of Littelfuse fuse 259 approved under Baseefa02ATEX0071U –Issue 3 coded Ex as a replacement to that approved under BAS Ex 832302U.
- vii. As a result of the modifications the Product Description, Conditions of Certification, Special Conditions for Safe Use and Marking were amended.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	19 April 2000	R52X6307A	The release of the prime certificate.
1	16 November 2000	52V6965	The introduction of Variation 1.
2	20 February 2002	R52A8653A	The introduction of Variation 2.
3	17 September 2002	52V9493	The introduction of Variation 3.
4	24 March 2003	R52A9400A	The introduction of Variation 4.
5	14 May 2003	52V10187	The introduction of Variation 5.
6	3 May 2006	R52V14453A	The introduction of Variation 6.
7	22 March 2012	R26573A/00	This Issue covers the following changes: <ul style="list-style-type: none">All previously issued certification was rationalised into a single certificate, Issue 7, Issues 0 to 6 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 7.



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EU-TYPE EXAMINATION CERTIFICATE

Sira 99ATEX2135X
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Issue	Date	Report no.	Comment
8	31st October 2019	2377	<ul style="list-style-type: none">• Transfer of certificate Sira 99ATEX2135X from Sira Certification Service to CSA Group Netherlands B.V..• EC Type-Examination Certificate in accordance with 94/9/EC updated to EU Type-Examination Certificate in accordance with Directive 2014/34/EU. <i>(In accordance with Article 41 of Directive 2014/34/EU, EC Type-Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Variations to such EC Type-Examination Certificates may continue to bear the original certificate number issued prior to 20 April 2016.)</i>

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 plastic enclosure 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** (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.

Certificate Annexe



Certificate Number: Sira 99ATEX2135X

Equipment: TX592x Vortex Gas Flow Sensor/Transformer

Applicant: Trolex Limited

Issue 0

Drawing	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

Issue 1

Drawing	Sheets	Rev.	Date	Description
P9000.100	1 of 1	C	7 Jun 00	Alternative Housing Arrangement

Issue 2

Drawing	Sheets	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

Issue 3

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

Issue 4

Drawing	Sheets	Rev.	Date	Description
P5431.02	1 of 1	D	06 Feb 03	General arrangement

Issue 5

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

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Certificate Annexe



Certificate Number: Sira 99ATEX2135X

Equipment: TX592x Vortex Gas Flow Sensor/Transformer

Applicant: Trolex Limited

Issue 6

Drawing	Sheets	Rev.	Date	Description
P5431.02	1 of 1	E	17 Jan 06	General Assembly

Issue 7

Drawing	Sheets	Rev.	Date (Sira Stamp)	Title
P5431.02	1 of 1	G	06 Mar 12	General Assembly
P5431.88	1 of 1	B	16 Feb 12	Certification Labels
P5431.01	1 of 1	E	16 Feb 12	Output PCB Certified Circuit Diagram

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