1. UNITED KINGDOM CONFORMITY ASSESSMENT

UK-TYPE EXAMINATION CERTIFICATE

2. **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres UKSI 2016:1107 (as amended) – Schedule 3A, Part 1**

3. **UK-Type Examination Certificate No:** **FM23UKEX0041X**

4. **Equipment or protective system: (Type Reference and Name)** **645i, 745i and TM500 Series Thermal Mass Gas Flow Meter and Temperature Transmitter**

5. **Name of Applicant:** **Sierra Instruments Inc**

6. **Address of Applicant** **20 Ryan Ranch Road, Ste 109, Monterey, California 93940, United States of America**

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

8. FM Approvals Ltd, Approved Body number 1725, in accordance with Regulation 42 of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, UKSI 2016:1107 (as amended), certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Schedule 1 of the Regulations.

   The examination and test results are recorded in confidential report number:

   PR466793 dated 18th September 2023

9. Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

   EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-31:2014, EN 60529:1991+A1:2000+A2:2013

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

11. This UK-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance with the Regulations. Further requirements of the Regulations apply to the manufacturing process and supply of this product. These are not covered by this certificate.

Certificate issued by:

16 April 2025

Victor Aluko-Oginni
Certification Manager, FM Approvals Ltd.

Date

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UKAS PRODUCT CERTIFICATION
0259

12. The marking of the equipment or protective system shall include:

Main Enclosure:
II 2 G Ex db IIB+H_2 T6 or T4 Gb Ta = -20°C to +70°C
II 2 D Ex tb IIIC T85°C or T135°C Db Ta = -20°C to +70°C

Remote Enclosure:
II 2 G Ex db IIB+H_2 T4 Gb Ta = -20°C to +70°C
II 2 D Ex tb IIIC T135°C Db Ta = -20°C to +70°C

13. **Description of Equipment or Protective System:**

General - The 645i, 745i and TM500 Series Thermal Mass Gas Flow Meter and Temperature Transmitters are used for measuring the mass flow of gases as well as the process gas temperature all in one package. The flowmeters are available for inline or insertion applications. The product features 4-20mA and/or pulse outputs and is also available with an optional display/configuration panel. Digital communications options include USB, HART and RS485 Modbus.

Construction - The 645i, 745i and TM500 Series Thermal Mass Gas Flow Meter and Temperature Transmitter consists of a dual-compartment electronics housing with thread-on blank or window covers and a probe threaded into the housing base. The remote version of the 645i, 745i and TM500 Series Thermal Mass Gas Flow Meter and Temperature Transmitter consists of the same dual-compartment electronics housing attached to a smaller remote enclosure with probe. The enclosures are provided with ¾ inch NPT openings. Probe mounting can be provided integrally, directly to the electronics housing, or can be remotely mounted, using the remote enclosure, up to 100 feet from the electronics housing.

Ratings - The 645i, 745i and TM500 Series Thermal Mass Gas Flow Meter and Temperature Transmitters operate at 12-28 Vdc (6W) or 100-240 Vac (7W). The transmitters are rated for use in an ambient temperature range of -20°C to +70°C. The transmitter probes are rated for use in a process temperature range of -40°C to +121°C at a maximum pressure of 740 psi.

The enclosures have an ingress protection rating of IP67.

Refer to the Annex for model codes.

14. **Specific Conditions of Use:**

1. The flamepaths of the equipment are not intended to be repaired. Consult the manufacturer if repair of the flamepath joints is necessary.
2. Refer to the manufacturer's instructions to reduce the potential of an electrostatic charging hazard on the equipment enclosure.
3. The equipment temperature code ratings are dependent on the enclosure configuration (local or remote). Refer to the following table for specific temperature code markings.

Model Code	Temperature Code Marking-Gas		Temperature Code Marking-Dust	
Enclosure (variable “l” on inline; "g" on insertion)	Main Enclosure	Remote Enclosure	Main Enclosure	Remote Enclosure
E1, E2, T1, T2	T4	N/A	T135°C	N/A
E3, E4, T3, T4, Y1, Y2	T6	T4	T85°C	T135°C

15. **Essential Health and Safety Requirements:**

    The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

16. **Test and Assessment Procedure and Conditions:**

    This UK-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

    Whilst this certificate may be used in support of a manufacturer's claim for UKCA Marking, FM Approvals Ltd accepts no responsibility for the compliance of the equipment against all applicable Regulations in all applications.

    This Certificate has been issued in accordance with FM Approvals Ltd's UKCA Certification Scheme.

17. **Schedule Drawings**

    A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Approved Body. The documents are maintained under project 3061039.

18. **Certificate History**

    Details of the supplements to this certificate are described below:

Date	**Description**
28 September 2023	Original Issue.
3 December 2024	Supplement 1: Report Reference: RR243270 dated 14th November 2024. Description of the Change(s): Added 1/2 inch probes and stainless steel enclosures. Model code reconfigured. Other documentation updates not affecting the equipment safety.
16 April 2025	Supplement 2: Report Reference: RR245662 dated 14 April 2025. Description of the Change(s): Updating company address and associated documentation changes.

ANNEX

645i Series and TM500 Series Insertion

Description of Equipment:

a-bcde-f-g-h-i. Thermal Mass Flow Meter and Temperature Transmitter (Insertion).
a = Model: 645i or TM500.
b = Probe length: 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 or 36.
c = Retractor: I, R or C.
d = Crank retractor diameter: BLANK, 1 or 2.
e = Crank retractor flange: BLANK, A1, A2, A3, N1, N2, J1 or J2.
f = Sensor diameter and material: BLANK, H3, J3, L3, S2, H2, J2 or L2.
g = Enclosure and power: E1, E2, E3, E4, T1, T2, T3, T4, Y1 or Y2.
h = Data logger and display: BLANK, D0, DL or L0.
i = Communication: B0, RS, BN or BH.

745i Series and TM500 Series Inline

Description of Equipment:

a-bcde-f-ghij-k-l-m-n. Thermal Mass Flow Meter and Temperature Transmitter (Inline).
a = Model: 745i or TM500.
b = Flowbody size: 025, 05, 075, 10, 125, 15, 20, 25, 30, 40, 60 or 80.
c = Flowbody type: P, F, G, H, D, E, J or K.
d = Flowbody material: BLANK or C.
e = Flowbody conditioner: BLANK or X.
f = Flowbody pipe schedule: BLANK, S05, S10 or S80.
g = Retractor length: BLANK, 15, 18, 24, 30 or 36.
h = Retractor: BLANK, R or C.
i = Crank retractor diameter: BLANK, 1 or 2.
j = Crank retractor flange: BLANK, A1, A2, A3, N1, N2, J1 or J2.
k = Sensor diameter and material: BLANK, H3, J3, L3, S2, H2, J2 or L2.
l = Enclosure and power: E1, E2, E3, E4, T1, T2, T3, T4, Y1 or Y2.
m = Data logger and display: BLANK, D0, DL or L0.
n = Communication: B0, RS, BN or BH.

Blueprint Report

Fox Thermal Instruments Inc 1000008198

Class No. 3615

Original Project I.D. 3052981

Certificate I.D. FM23ATEX0041X

Drawing No.	Revision Level	Drawing Title	Last Report	Electronic Drawing
109629	D	BioTrak 645S/745S Instruction Manual	RR245662	Yes (pdf)
109630	C	LABEL, SERIAL NUMBER, ELEX ENCL, 645S/745S SIERRA	RR245662	Yes (pdf)
109643	C	CONFIGURATION DRAWING, INSERTION, MODEL 645S	RR243270	Yes (pdf)
109644	C	CONFIGURATION DRAWING, INLINE, MODEL 745S	RR243270	Yes (pdf)
110068	C	TM100 Thermal Mass Flow Meter Instruction Manual	RR245662	Yes (pdf)