1. TYPE EXAMINATION CERTIFICATE

2. **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU**

3. **Type Examination Certificate No:**	**FM21ATEX0073X**
4. **Equipment or protective system: (Type Reference and Name)**	**ULTIMA X5000 Gas Monitor Fixed Gas Detection System (ULTIMA X5000 Transmitter, ULTIMA X5000 or JB5000 Junction Box, and ULTIMA XIR Plus Sensor)**
5. **Name of Applicant:**	**MSA Innovation LLC dba MSA - The Safety Company**
6. **Address of Applicant**	**1000 Cranberry Woods Drive, Cranberry Township, Pennsylvania 16066, 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 Europe Ltd, certifies that this component 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:

   PR460997 dated 9th August 2022

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 50104:2019, EN 50271:2018, EN IEC 60079-0:2018+A11:2024 , EN 60079-15:2010, EN 60079-29-1:2016+A1:2022+A11:2022, 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 Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

Certificate issued by:

Digitally signed by Richard Zammitt
Location: Ireland
Foxit PDF Editor Version: 13.1.2

Certification Manager, FM Approvals Europe Ltd. Date 29 July 2024

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FM Approvals Europe Ltd. One Georges Quay Plaza, Dublin. Ireland. D02 E440
T: +353 (0) 1761 4200 E-mail: atex@fmapprovals.com www.fmapprovals.com

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

See Annex

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

See Annex

14. **Specific Conditions of Use:**

See Annex

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 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 CE Marking, FM Approvals Europe Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Europe Ltd's ATEX 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 FM Approvals Europe Ltd.

18. **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
10 August 2022	Original Issue.
7 February 2023	Supplement 1: Report Reference: RR234893 dated 6th February 2023. Description of the Change: Minor changes to replace an obsolete component. Various drawing updates to correlate with previously approved changes. No change to firmware. X5000 Transmitter model code was incomplete. Fully updated the certificate text.

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SCHEDULE

to Type Examination Certificate No. FM21ATEX0073X

Date	Description
29 July 2024	Supplement 2: Report Reference: PR467005 dated 15 July 2024. Description of the Change(s): Hardware and firmware updates required additional performance testing. The listing is updated to reduce paragraphs and provide information in a standardized table format, to provide clarity, and to create a table listing all approved sensors for the system. A new specific condition of use is added to the ULTIMA XIR Plus sensors. The critical document list has been updated. The company name has been updated from "MSA - The Safety Company" to "MSA Innovation LLC dba MSA - The Safety Company".

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ANNEX

ULTIMA X5000 Gas Monitor

Markings:

II 3G
Ex nA IIC T4 Gc
-40°C ≤ Ta ≤ +60°C
EN 60079-29-1
EN 50104
IP66

Description of Equipment:

The ULTIMA X5000 Gas Monitor consists of an ULTIMA X5000 Transmitter and an optional ULTIMA X5000 or JB5000 Junction Box. The ULTIMA X5000 Gas Monitor supports up to two ULTIMA XIR Plus point IR Detectors, up to two General Monitors Inc. Digital Sensors (Combustible, Toxic, or Oxygen), or one ULTIMA XIR Plus point IR detector and one Digital Sensor simultaneously.

The ULTIMA X5000 Gas Monitor enclosure consists of a single 316 stainless steel or aluminium compartment enclosure measuring approximately 5.9 inches in width, 5.7 inches in height with depths of 3.8 and 4.8 inches (depending on the windowed cover installed). The transmitter provides ¾ inch NPT threaded conduit entries, or optionally M25 straight threaded entries. Unused entries are fitted with suitably certified blanking plugs. M25 to ¾ inch NPT adapters are provided for connecting of sensors.

Model Code Options:

A-X5000-abcdeffggh, Gas Monitor Model ULTIMA X5000
a is for Enclosure Material:
0 = Stainless Steel – ¾" NPT
1 = Aluminium - ¾" NPT
2 = Stainless Steel – M25
b is for listed Approval:
A = IECEx / ATEX / UKCA
c is for Bluetooth:
0 = Yes
1 = No
d is for Output Communication:
0 = Analog/HART
e is for Advanced Option
0 = Default place holder, not relevant to certification
ff is for Sensor 1 selection:
See Model Code column of the Sensor Table
gg is for Sensor 2 selection:
See Model Code column of the Sensor Table
h is for Tag:
0 = None

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T# = (# = 1, 2, or 3) Stainless Steel affixed tags

Specifications:

Sensor Type:	See Sensor Table for sensor type
Gases:	See Sensor Table for approved gases
Range:	See Sensor Table for ranges
Installation:	Fixed
Sampling Type:	See Sensor Table for sampling type
Accuracy:	See Sensor Table for sensor accuracy
Response Time:	See the Sensors Table for response time
Supply Parameters:	11-30Vdc, 15W max
Operating Temperature:	-40°C to +60°C
Storage Temperature:	-40°C to +60°C
Relative Humidity:	5 to 95% RH non-condensing
Measurement Signal:	Two 4-20mA, LED Display
Alarms:	LED Display, Relay (5A 30Vdc / 250Vac)
Firmware:	NXP Microprocessor: 2.00.0065 ST Microprocessor: 4.01.0016

Approved Sensors - The following sensors have been performance tested for use with the ULTIMA X5000 Gas Monitor, X5000 Junction Box, and JB5000 Junction Box:

Product / Listing Title	Company	Certificate Number
ULTIMA XIR Plus Combustible Gas Sensors	MSA Innovation LLC dba MSA - The Safety Company	FM21ATEX0073X
Digital Sensor (Combustible, Oxygen)	General Monitors Inc an MSA Company	FM21ATEX0072X

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Specific Conditions of Use:

1. Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall only be cleaned with a damp cloth.
2. This fixed equipment is designed for field mounting in the vertical orientation with restrictions placed around the conduit entry locations permitted for connection of both the Digital Sensor and ULTIMA XIR Plus infrared (IR) sensors. The equipment is subject to the installation and orientation requirements defined in the product manual.
3. Guidance for Installation of fixed gas detection systems are set out in EN 60079-29-2 which has not been covered in the scope of this assessment.
4. Guidance for functional safety of fixed gas detection systems are set out in EN 60079-29-3 which has not been covered in the scope of this assessment.

Conditions relating to EN 50271:2018

1. The user shall comply with the requirements given in the manufacturer's user documentation in regards to all relevant functional safety aspects such as application of use, installation out of hazardous areas, operation, maintenance, proof tests, maximum ratings, environmental conditions, and repair.
2. Selection of this equipment for use in safety functions, configuration, overall validation, maintenance and repair shall only be carried out by competent personnel, observing all the manufacturer's conditions and recommendations in the user documentation.

ULTIMA X5000 Junction Boxes

Markings:

II 3G
Ex nA IIC T6 Gc
-40°C ≤ Ta ≤ +60°C
EN 60079-29-1
EN 50104
IP66

Description of Equipment:

The ULTIMA X5000 Junction Boxes are the remote mounting units of ULTIMA X5000 Gas Monitor fixed gas detection system. The X5000 enclosures are provided with either ¾" NPT or M25 threaded entries and a certified adapter can be supplied for M25 entries which can be fitted with sensors approved for use with the X5000, suitably certified cable entry devices, or blanking plugs. The equipment enclosure has been separately tested against the requirements of EN 60529 and meets IP66.

ULTIMA X5000 Junction Boxes

Model Reference	Description
10179509	ULTIMA X5000 Junction Box; Stainless Steel, ¾" NPT
10179511	ULTIMA X5000 Junction Box; Stainless Steel, M25

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Model Reference	Description
10179513	ULTIMA X5000 Junction Box; Aluminium, ¾" NPT

Specific Conditions of Use:

1. Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall only be cleaned with a damp cloth.
2. This fixed equipment is designed for field mounting in the vertical orientation with restrictions placed around the conduit entry locations permitted for connection of the Digital Sensor and the ULTIMA XIR Plus infrared (IR) sensor. The equipment is subject to the installation and orientation requirements defined in the product manual.

ULTIMA JB5000 Junction Boxes

Markings:

II 3G
Ex nA IIC T6 Gc
-55°C ≤ Ta ≤ +75°C
EN 60079-29-1
EN 50104
IP66

Description of Equipment:

The ULTIMA JB5000 Junction Boxes are the remote mounting units of ULTIMA X5000 Gas Monitor fixed gas detection system. The JB5000 enclosures are provided with either ¾" NPT or M25 threaded entries and a certified adapter can be supplied for M25 entries which can be fitted with sensors approved for use with the X5000, suitably certified cable entry devices, or blanking plugs. The equipment enclosure has been separately tested against the requirements of EN 60529 and meets IP66.

ULTIMA JB5000 Junction Boxes

Model Reference	Description
10213892	JB5000 Junction Box; Stainless Steel, ¾" NPT
10213896	JB5000 Junction Box; Stainless Steel, M25

Specific Conditions of Use:

1. Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall only be cleaned with a damp cloth.
2. This fixed equipment is designed for field mounting in the vertical orientation with restrictions placed around the conduit entry locations permitted for connection of the Digital Sensor and the ULTIMA XIR Plus infrared (IR) sensor. The equipment is subject to the installation and orientation requirements defined in the product manual.

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3. When the manufacturer of the equipment has not identified the type of protection on the label, the user shall, on installation, mark the label adjacent to the type of protection used. Once the type of protection has been marked it shall not be changed.

ULTIMA XIR Plus Sensor

Markings:

II 3G
Ex nA IIC T6 Gc
-40°C ≤ Ta ≤ +60°C
EN 60079-29-1
IP66

Description of Equipment:

The ULTIMA XIR Plus Combustible Gas Sensor consists of a two-piece stainless steel enclosure with lens assembly and includes a ¾" NPT or M25 thread for connection to the X5000 Transmitter. Remote connection requires the X5000 Junction Box or JB5000 Junction Box.

Model Code Options:

A-5K-SENS-a-b-c-d-e ULTIMA XIR Plus Infrared Combustible Sensor
a is for Gas Type:
See Model Code column of Sensor Table
b is for material type:
0 = Stainless Steel
c is for listed Approval:
A = IECEx / ATEX / UKCA
d is for Sensor Body Thread Type:
1 = ¾ NPT
2 = M25
e is for Advanced Option:
0 = none

Sensor Table:

Model Code	Gas	Range
AA	Methane - CH_4	0-100% LFL – 5% vol
AB	Propane - C_3H_8	0-100% LFL – 2.1% vol
AC	Methane - CH_4	0-100% LFL –4.4% vol
AD	Propane - C_3H_8	0-100% LFL – 1.7% vol
AK	Acetone - C_3H_6O	0-100% LFL – 2.5% vol
AS	Benzene - C_6H_6	0-100% LFL – 1.2% vol

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SCHEDULE

to Type Examination Certificate No. FM21ATEX0073X

Model Code	Gas	Range
BY	Ethanol - C_2H_6O	0-100% LFL – 3.3% vol
CD	Ethylene - C_2H_4	0-100% LFL – 2.7% vol
CF	Ethylene Oxide - C_2H_4O	0-100% LFL – 3.0% vol
CJ	Hexane - C_6H_{14}	0-100% LFL – 1.1% vol
CP	Isopropanol - C_3H_8O	0-100% LFL – 2.0% vol
DJ	Methyl Methacrylate - $C_5H_8O_2$	0-100% LFL – 1.7% vol
FJ	Ethanol - C_2H_6O	0-100% LFL – 3.1% vol
FL	Ethylene - C_2H_4	0-100% LFL – 2.3% vol
FM	Ethylene Oxide - C_2H_4O	0-100% LFL – 2.6% vol
FP	Hexane - C_6H_{14}	0-100% LFL – 1.0% vol
XX	Any two digit letter representing: - Gas Type ULTIMA XIR Plus infrared Combustible sensor, not verified by FM Approvals for the specific flammable gas for performance to EN 60079-29-1 or - Toxic Type ULTIMA XIR Plus infrared Toxic sensor	N/A

Specifications:

Sensor Type:	IR
Sampling Type:	Diffusion
Accuracy:	±5% F.S.
Response Time:	t(90) ≤ 60 s
Operating Temperature:	-40°C to +60°C
Storage Temperature:	-40°C to +60°C
Relative Humidity:	5 to 90% RH, non-condensing
Firmware:	NXP Microprocessor: 3.52 ST Microprocessor: 4.0.8

Specific Conditions of Use:

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1. For any sensors not specifically identified as having performance testing, the sensors shall require additional evaluation if used within a safety related system.
2. Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall only be cleaned with a damp cloth.
3. The ULTIMA XIR Plus infrared (IR) sensor is provided with a ¾“ NPT thread and shall only be connected to a suitably certified junction box or instrument for the hazardous area of installation and thereby provide Ex protection for the flying lead connections. The installation to the certified enclosure shall be with five fully engaged threads, tightened wrench-tight.
4. The ULTIMA XIR Plus shall only be installed for external connection to suitably certified equipment (transmitters) providing transient protection set at a maximum transient overvoltage of 119 V (140% of 85 Vpeak). The operating manual shall reinforce this installation requirement.
5. The ULTIMA XIR Plus infrared (IR) sensor shall only be fitted to enclosures having a maximum reference pressure of 13.5 bars.
6. In combustible gas detection performance applications, the appropriate ULTIMA XIR Plus model number shall only be used to construct the ULTIMA X5000 Gas Monitor fixed gas detection system; mounted onto either the ULTIMA X5000 transmitter or ULTIMA X5000 Junction Box enclosures and receive power and control from the transmitter.
7. The Ingress Protection rating is exclusively based upon the installation instruction for orientation specified in the operating manual.
8. Guidance for Installation of fixed gas detection systems are set out in EN 60079-29-2 which has not been covered in the scope of this assessment.
9. Guidance for functional safety of fixed gas detection systems are set out in EN 60079-29-3 which has not been covered in the scope of this assessment.
10. When the manufacturer of the equipment has not identified the type of protection on the label, the user shall, on installation, mark the label adjacent to the type of protection used. Once the type of protection has been marked it shall not be changed.
11. The XIR Plus Sensor enclosure with Sensor Guard (opaque cover) or enclosure must fully contain the optical radiation and comply with a suitable type of protection as required by the involved EPL, complying with one of the following conditions:

    - An enclosure for which protection regarding ingress of an explosive dust atmosphere is provided, such as dust protection "t" enclosures" (IEC 60079-31), or
    - An enclosure that provides a minimum ingress protection of IP 6X and where no internal absorbers are to be expected and complying with “Tests of enclosures” in IEC 60079-0.

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Blueprint Report

MSA Innovation LLC dBA MSA - The Safety Company (1000001671)

Class No 6340

Original Project I.D. 449063

Certificate I.D. FM21ATEX0073X

Drawing No.	Revision Level	Drawing Title	Last Report
10000012326	4	Commercial Specification, Window, Sapphire, 31.40	457661
10000012327	5	Commercial Specification, Window, Sapphire, 29.99	457661
10000012485	4	Detector, Pyroelectric, Reference	449063
10000012486	4	Detector, Pyroelectric, Analytical	449063
10000012677	3	Mirror, electro-formed, IRIS	449063
10000013620	2	Commercial Specification, O-Ring: Marco Rubber & Plastics Inc #Y1000-015	449063
10000013621	2	Commercial Specification, O-Ring: Marco Rubber & Plastics Inc #Y1000-021	449063
10000013622	2	Commercial Specification, O-Ring: Marco Rubber & Plastics Inc #Y1000-137	449063
10000014788	1	Guard, Environmental, Ultima X IR	449063
10000017045	0	Separator, Feed Thru wire, Ultima XI	449063
10000017493	2	Fixture, Lower Assembly, Ultima XI	449063
10000017784	3	Ring, Retaining, Window, Loose, Ultima XI	449063
10000017954	3	Fixture, Lower, Machined, Ultima XI	449063
10047990	4	Fixture, Feedthru, Ultima XI	449063
10071676	1	Commercial Specification, M25 Plug:Pipe, Brass, Nickle Plated (Redapt / HLS)	449063
10162584	1	X5000 Option (Relay) Board, PCB	460997
10162585	0	X5000 Option (Relay) Board, PCB Assembly	449063
10163332	3	X5000 Main Board, PCB	460997
10163333	2	X5000 Main Board, PCB Assembly	460997
10164155	1	XIR Plus Power Board, PCB	PR467005
10164157	1	XIR Plus Power Board, PCB Assembly	PR467005
10164799	4	X5000 User Interface Board, PCB	RR234893
10164800	3	X5000 User Interface Board, BOM	457661
10166044	4	Wire Harness, Assembly, Ultima XIR Plus	RR234893
10172002	1	XIR Plus Main Board, PCB	449063
10172003	0	XIR Plus Main Board, PCB Assembly	449063
10176109	0	X5000 Junction Box Board, PCB	449063
10176110	2	X5000 Junction Box Board, PCB Assembly	RR234893
10177157	2	X5000 Option (Relay) Board, SMTA	460997
10177160	1	XIR Plus Main Board, SMTA	449063
10177161	2	XIR Plus Power Board, SMTA	449063
10177166	0	X5000 Junction Box Board, SMTA	449063
10177168	2	Enclosure, Upper, Ultima XIR Plus	449063
10177361	8	Operating Manual, Ultima X5000 Gas Monitor	RR234893
10177819	1	Digital Sensor BOM	449063
10179953	0	Commercial Specification, Brady Label #Y4280415	449063
10182779	10	Addendum to Ultima X5000 Gas Monitoring System Operating Manual 10177361	PR467005
10206281	1	JB5000 BOM	457661
10238700	0	Printed Circuit Board ULTIMA X5000 Main	PR467005
10238702	0	Printed Circuit Board Assembly ULTIMA X5000 Main	PR467005
10239055	1	PCB ULTIMA XIR/XIR Plus Main	PR467005
324117	0	Glass Window, Ultima X5000/S5000	449063
486482	4	CUP:Porous, 60 MICRON	449063
5-5088-1	2	X5000 User Interface Board, SMTA	RR234893
7-7195-1	0	X5000 cover assembly	449063
7-7199-1	2	X5000 User Interface Board, PCB Assembly	RR234893
7-7206-1	7	Assy, X5000 and X5000 Junction Box, Board Stack	PR467005
7-7207-1	3	Sensor, Ultima XIR Plus	457661
7-7212-1	1	Detector Block Assy, XIR Plus	449063
7-7213-1	6	XCELL Sensor Assembly	RR234893
7-7223-1	6	Junction Box Assembly, Ultima X5000	RR234893
7-7296-1	3	X5000 Main Board, SMTA	460997
7-7314-1	1	SMTA ULTIMA XIR/XIR Plus Main	PR467005
7-7315-1	1	PCBA ULTIMA XIR/XIR Plus Main	PR467005
7-7316-1	1	SMTA ULTIMA XIR Plus, Power	PR467005
7-7317-1	0	SMTA ULTIMA X5000, Main	PR467005
A-X5000	24	Coded Configuration Matrix, Ultima X5000	PR467005
SK3068-1124	3	Software release drawing, XIR Plus	PR467005
SK3068-1125	5	Firmware, X5000, Control	460997
SK3068-1126	2	Firmware, NGTP ASIC Sensor	449063
SK3068-1131	3	Firmware, NGTO, Lifehealth	PR467005
SK3068-1148	1	Firmware, NGTP Lifehealth with Diffusion Supervision	457661
SK3068-1200	0	Firmware, XIR Plus ST Micro controller	PR467005
SK3068-1207	1	Source Code, Firmware, X5000 3 Wire	PR467005
SK3073-1134	0	X5000 Option (Relay) Board, Schematic	449063
SK3073-1143	4	XIR Plus Main Board, Schematic	PR467005
SK3073-1144	3	XIR Plus Power Board, Schematic	PR467005
SK3073-1145	1	X5000 User Interface Board, Schematic	460997
SK3073-1146	4	X5000 Main Board, Schematic	PR467005
SK3073-1149	1	X5000 Junction Box Board, Schematic	460997
SK3098-1453	0	5000 Series Digital Sensor, Approval Drawing, Supplemental	457661
SK3098-1460	2	Approval Drawing, Conduit Plugs and Adapter, FM	RR234893

SK3098-1461	0	Ultima X5000 Series Approval Drawing - FM	457661
SK3098-1464	1	JB5000 JUNCTION BOX, APPROVAL DRAWING, CSA	RR234893
SK3098-1467	0	JB5000 JUNCTION BOX, APPROVAL DRAWING, ELECTRONICS, CSA	457661
SK3098-1483	3	X5000 Series Gas Detector FM Markings Approval Drawing	PR467005
SP10166044	0	Engineering Specification for Preparation and Application of EPOCAP 45137A & 55137B Potting Compound	449063