



IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

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Certificate No.: **IECEX ITA 13.0021X** Page 1 of 5 Certificate history:
Status: **Current** Issue No: 3 [Issue 2 \(2018-10-04\)](#)
Date of Issue: 2021-08-19 [Issue 1 \(2016-09-01\)](#)
[Issue 0 \(2014-05-27\)](#)
Applicant: **Nautitech Mining Systems Pty Ltd**
Unit 3/9 Packard Ave
Castle Hill NSW 2154
Australia
Equipment: **Remote CH4 Monitor**
Optional accessory:
Type of Protection: **Intrinsic Safety "ia", Flameproof "d"**
Marking: Ex d ia I Mb (Um available) / Ex ia I Ma (Um withdrawn)

Approved for issue on behalf of the IECEx
Certification Body:

Ajay Maira

Position:

Certification Authority

Signature:
(for printed version)

Ajay Maira

Date:

2021-08-19

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2. This certificate is not transferable and remains the property of the issuing body.
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Certificate issued by:

Ex Testing and Certification Pty Ltd
1/30 Kennington Drive
Tomago NSW 2322
Australia



TESTING & CERTIFICATION



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Manufacturer: **Nautitech Mining Systems Pty Ltd**
Unit 3/9 Packard Ave
Castle Hill NSW 2154
Australia

Additional
manufacturing
locations:

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEX Quality system requirements. This certificate is granted subject to the conditions as set out in IECEX Scheme Rules, IECEX 02 and Operational Documents as amended

STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0:2011 Explosive atmospheres - Part 0: General requirements
Edition:6.0

IEC 60079-1:2007-04 Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
Edition:6

IEC 60079-11:2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition:6.0

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Reports:

[AU/EXTC/ExTR18.0030/00](#)
[AU/ITA/ExTR13.0024/00](#)

[AU/ITA/ExTR13.0022/00](#)
[AU/ITA/ExTR13.0025/00](#)

[AU/ITA/ExTR13.0023/00](#)

Quality Assessment Report:

[AU/MSQ/QAR21.0001/00](#)



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EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

The **complete equipment 'Remote CH4 Monitor' has 3 models** (provided below). It has been assessed in Report AU/ITA/ExTR 13.0025/000 It is made up of the following parts:

The Gas Sensor 'NTMS RapidSense CH4 Model ME5070-2-99-112'

A flameproof enclosure on which the above Gas Sensor may be fitted

Intrinsically safe interface board fitted within the flameproof enclosure

- **Model ME5070-2-99-139:** Electronics including a CHR Display fitted in a NTMS (Nautitech) Flameproof enclosure (Ex d I/IIC T5 Mb Gb), as certified under IECEX ITA 12.0007X
- **Model ME5070-2-99-140:** Electronics including a LCD Display fitted in a NTMS (Nautitech) Flameproof enclosure (Ex d I/IIC T5 Mb Gb), as certified under IECEX ITA 12.0007X
- **Model ME5070-2-99-141:** Electronics including a CHR Display fitted in a ATF 351 Flameproof enclosure (Ex d I IP66), as approved under IECEX SIM 05.0007X

See Annex for further details

SPECIFIC CONDITIONS OF USE: YES as shown below:

See Annex for details



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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)
See Annexe for details



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Additional information:

Job 21105

Annex:

[IECEX Certificate 13.0021X-3 Annex - final.pdf](#)

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Description:

The **complete equipment 'Remote CH4 Monitor' has 3 models** (provided below). It has been assessed in Report AU/ITA/ExTR13.0025/00. It is made up of the following parts:

- The Gas Sensor 'NTMS RapidSense CH4 Model ME5070-2-99-112' (Ex d ia I Mb). This was tested and assessed as follows:
 - Report AU/ITA/ExTR13.0022/00 for the intrinsically safe gas sensor (Ex ia I Ma) (Including electronics)
 - Report AU/ITA/ExTR13.0023/00 and AU/EXTC/ExTR18.0030/00 for the Sensor housing, flameproof cemented bush, cover and thread (Ex d I Mb)
- A flameproof enclosure on which the above Gas Sensor may be fitted:
 - **Model ME5070-2-99-139:** Electronics including a CHR Display fitted in a NTMS (Nautitech) Flameproof enclosure (Ex d I/IIC T5 Mb Gb), as certified under IECEX ITA 12.0007X
 - **Model ME5070-2-99-140:** Electronics including a LCD Display fitted in a NTMS (Nautitech) Flameproof enclosure (Ex d I/IIC T5 Mb Gb), as certified under IECEX ITA 12.0007X
 - **Model ME5070-2-99-141:** Electronics including a CHR Display fitted in a ATF 351 Flameproof enclosure (Ex d I IP66), as approved under IECEX SIM 05.0007X
- The electronics within the flameproof enclosure (intrinsically safe interface) fitted within the above flameproof enclosure was assessed in report AU/ITA/ExTR13.0024/00, and this provides the Ex ia I power and communication to the Gas Sensor 'NTMS RapidSense CH4'

Note: The intrinsically safe gas sensing cell used within the Gas Sensor 'NTMS RapidSense CH4' makes use of an IR sensor that is certified under certificate IECEX SIR 03.0003U (reviewed in report AU/ITA/ExTR13.0022/00) to the following standards:

- IEC 60079-0 : 2004 Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
- IEC 60079-0 : 2007 Explosive atmospheres - Part 0: Equipment - General requirements
- IEC 60079-11 : 2006 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

Note: The NTMS Flameproof enclosure used within the 'Remote CH4 Monitor' makes use of a flameproof enclosure that is certified under certificate IECEX ITA 12.0007X to the following standards:

- IEC 60079-0 : 2011 Explosive atmospheres - Part 0: Equipment - General requirements
- IEC 60079-1 : 2007 Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"

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Note: The ATF 351 Flameproof enclosure used within the 'Remote CH4 Monitor' CH4' makes use of a flameproof enclosure that is certified under certificate IECEX SIM 05.0007X to the following standards:

- IEC 60079-0 : 2000 Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
- IEC 60079-1 : 2001 Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosures 'd'

A 9 watt heater mounted into the wall of the CH4 sensor's threaded flameproof bushing is used to preheat the sensor housing which improves performance during extreme atmospheric temperature changes. It also reduces the chance of condensation forming on the sensor element.

The power connected to the complete equipment '**Remote CH4 Monitor**' consists of two different power sources:

- The non-intrinsically safe power source that is used to power the non-i.s. CAN electronics, display and sensor heater. This power is not available when the Um is withdrawn. Energy from this source into the intrinsic safety energised sector is prevented by means of the Interface Board.
- The intrinsic safety power supply and comms that continues to provide i.s. power even when Um is withdrawn. This i.s. power is further limited by means of the Interface Board prior to connection to the external Gas Sensor. The Interface Board also provides power to an i.s. LED Display within the flameproof enclosure that remains energised when the Um is withdrawn.

The equipment has different Ex ratings based on the isolation of energised circuits at the different connection facilities:

- **Ex d ia I Mb (Um available):**
 - The non-intrinsically safe power source as well as the intrinsic safety power supply and comms are available to the flameproof enclosure and its internal intrinsic safety interface board. The non-i.s. power supply lines energise the the non-i.s. display (graphics and LED) and non-i.s. associated data lines (CAN bus).
 - The interface board continues to provide [Ex ia I] to the NTMS RapidSense CH4 Sensor
 - The CH4 sensor head electronics remain intrinsically safe at all times.
 - See safety parameters below.
- **Ex ia I Ma (Um withdrawn):**
 - All power and data sources are from associated intrinsically safe sources only
 - The internal powered circuits inside the flameproof enclosure comply with intrinsic safety.
 - Two possible states exist, depending on whether the J6/J7 CAN Bus and J4/J5 non-i.s. power supply are not connected or connected
 - See safety parameters below.
- For both Ex ratings above, the outputs to the Gas sensor (interface connection J2) and the LED indicators (Interface connection J3) are intrinsically safe Ex ia I Ma.

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Specific Conditions of Use pertaining to Issue 0 of this Certificate:

The safety parameters for the different terminals / connectors on the internal interface board fitted in the external flameproof enclosure are considered as follows:

Connector / terminal block	Ex d ia I Mb	Ex ia I Ma (-20°C ≤ Tamb ≤ 60°C)	
J1 (Power supply and safe signal):	Um = 24VDC	Ui=16V Ii = 3.5A Pi = 2.8W Ci = 15.2uF	Ui=16V Ii = 3.5A Pi = 2.8W Ci = 15.2uF
J6/J7 (i.s power supply and signals / CAN bus)	No connection	No connection	
J4/J5 (non-i.s. power supply and signals / CAN bus)	Um = 24VDC	No connection (Power removed)	
J2 (Power and signal lines / CAN bus to CH4 sensor)	Uo = 6.835V Io = 3.3A Po = 2W Co = 1000uF Lo = 42.85uH		
J3 (LED outputs)	Uo = 6.835V Io = 3.28A Po = 0.67W Co = 1000uF Lo = 52.2uH		

The above output load parameters apply where;

- The external circuit contains no combined lumped inductance (L_i) or lumped capacitance (C_i) greater than 1% of the above values. OR
- The external circuit contains either only lumped inductance (L_i) or lumped capacitance (C_i) in combination with a cable. OR
- The inductance and capacitance are distributed as in a cable.

In all other situations e.g. the external circuit contains combined lumped inductance and capacitance, up to 50% of each of the inductance and capacitance values are allowed.

Note: The method of isolation / no connection is not part of this approval.

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Drawing list pertaining to Issue 0 of this Certificate:

Manufacturer's Documents

Gas Sensor 'NTMS RapidSense CH4 Model ME5070-2-99-112' (Report AU/ITA/ExTR13.0022/00)

Title	Drawing No:	Sheets	Rev	Date
IS CH4 SENSOR - SIGNAL COND. BOARD (<i>Schematic</i>)	ME5070-2-12-003-A	1	2	2014-05-14
IS CH4 SENSOR - MICRO BOARD (<i>Schematic</i>)	ME5070-2-12-004-A	1	4	2014-03-25
IS CH4 SENSOR – MICRO BOARD (<i>PCB Artwork</i>)	ME5070-0-12-004-A	5	4	2013-03-20
IS CH4 SENSOR – SIGNAL COND. BOARD (<i>PCB Artwork</i>)	ME5070-0-12-003-A	5	4	2013-03-22
SENSOR ELEMENT ASSEMBLY – CH4	ME5070-2-19-009-A	1	7	2014-05-02
LABEL - GAS SENSOR ELEMENT	ME5070-0-25-017-A	1	2	2014-04-08

Flameproof bush (Report AU/ITA/ExTR13.0023/00)

Title	Drawing No:	Sheets	Rev	Date
SENSOR ASSEMBLY – RAPIDSENSE – IS CH4	ME5070-2-99-112-A	1	4	2014-05-02
IS CH4 SENSOR – RECEPTACAL BOARD (<i>Circuit Schematic</i>)	ME5070-2-12-019-A	1	01	2014-01-30
IS CH4 SENSOR – RECEPTACLE BOARD (<i>PCB Artwork</i>)	ME5070-0-12-019-A	5	1	2013-03-15
LABEL-CH4 SENSOR – OUTER HOUSING	ME5070-0-25-030-A	1	3	2014-05-02
FITTING & CONNECTOR ASSEMBLY – Exd IS CH4 SENSOR	ME5070-2-04-009-A	1	6	2013-11-07

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Interface Board (Report AU/ITA/ExTR13.0024/00)

Title	Drawing No.	Sheets	Rev. Level	Date
IS CH4 SENSOR – INTERFACE BOARD (<i>Schematics</i>)	ME5070-2-12-005-A	3	04	2014-02-04
IS CH4 SENSOR- INTERFACE BOARD (<i>PCB layout</i>)	ME5070-0-12-005-A	8	5	2014-04-11

Remote CH4 Monitor - Final Assembly (Report AU/ITA/ExTR 13.0025/000)

Title	Drawing No.	Sheets	Rev. Level	Date
GRAPHICAL DISPLAY - SENSORS AND INDICATORS	ME5040-2-12-010-A	1	06	2014-05-01
LABEL - CH4 SENSOR - OUTER HOUSING - EX INFO	ME5070-0-25-048-A	1	1	2014-05-02
IS GAS SENSOR AND CHR DISPLAY ASSY	ME5070-2-99-139-A	1	3	2014-05-02
LCD DISPLAY FLP ENCLOSURE WITH IS CH4 SENSOR ASSEMBLY	ME5070-2-99-140-A	1	3	2014-05-05
CHARACTER DISPLAY ATF FLP ENCLOSURE WITH IS CH4 GAS SENSOR	ME5070-2-99-141-A	1	3	2014-05-05
WIRING - IS CH4 SENSOR AND DISPLAY	WD507001-A	1	06	2014-05-05
GRAPHICAL DISPLAY – SENSORS AND INDICATORS (PCB Layouts)	ME5040-0-12-010-A	2	1	2014-05-14
IS LED BOARD – BASIC DISPLAY (PCB Layouts)	ME5070-2-12-045-A	5	01	2013-04-18
IS LED BOARD - BASIC DISPLAY (Circuit Schematic)	ME5070-2-12-045-A	1	01	2013-04-19
Sensor Assembly – Rapidsense – IS CH4*	ME5070-2-99-112-A	1	4	2014-05-02

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Variations permitted by Issue 1 of this certificate:

This change relates to editorial changes to the marking plate.

Specific Conditions of Use pertaining to Issue 1 of this certificate:

The conditions remain unchanged from the prior issue.

Drawings Associated with the Issue 1 of this Certificate:

Manufacturer's Documents

Title	Drawing No.	Sheets	Rev. Level	Date
LABEL - CH4 SENSOR - OUTER HOUSING - EX INFO	ME5070-0-25-048-A	1	2	2016-05-13

Variations permitted by Issue 2 of this certificate:

- The addition of a 9-watt heater mounted into the CH4 sensor's flameproof bushing wall, with associated offset of the potted cable entry. Compliance has been assessed in report AU/EXTC/ExTR18.0030/00.
- Changes to equipment description to reflect this change.

Specific Conditions of Use pertaining to Issue 2 of this certificate:

The conditions remain unchanged from the prior issue.

Drawings Associated with the Issue 2 of this Certificate:

Manufacturer's Documents

Title	Drawing No.	Sheets	Rev. Level	Date
FITTING & CONNECTOR ASSEMBLY – Ex d ia IS CH4 SENSOR	ME5070-2-04-009-A	1	7	2018-08-10
SENSOR ASSEMBLY – RAPIDSENSE – IS CH4	ME5070-2-99-112-A	1	5	2018-08-10
RapidSense CH4 Sensor – Power/Comms	D507005-4	1	1	2018-09-26

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Variations permitted by Issue 3 of this certificate:

- The manufacturer's Quality Assessment was changed from Ex Testing and Certification to another IECEx Certification Body, Mine Safety Technology Centre. QAR reference has been changed accordingly.

Specific Conditions of Use pertaining to Issue 3 of this certificate:

There are no changes to the conditions of use.

Drawings Associated with the Issue 3 of this Certificate:

There are no drawings applicable to this issue of the certificate.