



IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: **IECEX TSA 09.0014X** issue No.: 5
Status: **Current**
Date of Issue: **2011-08-26** Page 1 of 4

Certificate history:
Issue No. 5 (2011-8-26)
Issue No. 4 (2011-5-19)
Issue No. 3 (2011-3-16)
Issue No. 2 (2010-8-23)
Issue No. 1 (2009-12-17)
Issue No. 0 (2009-8-7)

Applicant: **Mine Safety Appliances Co.**
1000 Cranberry Woods Drive
Cranberry Township PA 16066-5207
United States of America

Electrical Apparatus: **Altair 5 iR Multi-Gas Detector**
Optional accessory:

Type of Protection: **Intrinsic safety 'ia'**

Marking: **MSA Altair 5 iR
Ex d ia I IP54
Ex d ia IIC T4 IP54
MSA Altair 5X iR
Ex d ia I IP65
Ex d ia IIC T4 IP65
IECEX TSA 09.0014X
S/N: _____**

Approved for issue on behalf of the IECEx
Certification Body:

Ujen Singh

Position:

Quality and Certification Manager

Signature:
(for printed version)

Date:

26 AUGUST 2011

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the [Official IECEx Website](http://www.iecex.com).

Certificate issued by:

TestSafe Australia
919 Londonderry Road
Londonderry NSW 2753
Australia





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Manufacturer: **Mine Safety Appliances Co.**
1000 Cranberry Woods Drive
Cranberry Township PA 16066-5207
United States of America

Manufacturing location(s):

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 electrical apparatus 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 : 2004 Edition: 4.0	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
IEC 60079-1 : 2003 Edition: 5	Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosure 'd'
IEC 60079-11 : 2006 Edition: 5	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

*This Certificate **does not** indicate compliance with electrical 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 Report:

AU/TSA/ExTR09.0025/00
AU/TSA/ExTR11.0018/00

AU/TSA/ExTR10.0043/00
AU/TSA/ExTR11.0045/00

AU/TSA/ExTR11.0009/00

Quality Assessment Report:

FR/INE/QAR08.0011/02



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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The Altair 5 iR Multi-gas Detector is a 6 Gas instrument. It contains one dual toxic electrochemical cell, one single toxic electrochemical cell, one catalytic bead combustible cell, one oxygen electrochemical cell, and an infrared sensor. The Altair 5X iR Multi-gas Detector is a 6 Gas instrument. It contains one dual XCell toxic electrochemical cell, one single XCell toxic electrochemical cell, one XCell combustible cell, one XCell oxygen electrochemical cell, and an infrared sensor. One electrochemical sensor bay can be fitted either with a XCell electrochemical cell or a 20 mm electrochemical cell.

It measures 170 mm by 90 mm by 47 mm. The body is made of polycarbonate and the overmoulding is conductive, of the same material as the Altair 4 gas detector. The display may be mono or colour. The apparatus uses rechargeable Lithium Ion battery (Panasonic CGR18650DA cell).

CONDITIONS OF CERTIFICATION: YES as shown below:

Please refer to Annexe of the certificate.



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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Please refer to Annexe of the certificate.



IECEX Certificate of Conformity Annexe

Annexe for Certificate No.:	IECEX TSA 09.0014X	Issue No.:	5
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Conditions of Certification pertaining to Issue 0 of this Certificate:

1. It is a condition of safe use that the rechargeable battery shall be charged in a safe area and charge voltage shall not exceed 6.7 V.

Drawing list pertaining to Issue 0 of this Certificate:

Document No.	Sheets	Document Title	Issue	Date
SK3098-1126	36	Altair5/Altair5 iR Test Safe, Global Release (<i>PCB Artworks and assembly drawings</i>)	0	2009/04/01
10102321	1	Printed Circuit Board, Global, Altair5 Main	1	2009/05/01
SK3073-1048	4	Wiring Schematic, Altair5 Main Board	4	2009/05/08
10083572	1	Box, Potting, PC Board Assembly, Altair5	1	2009/04/06
DG6214500	1	Microprocessor (<i>Schematic, sheet 2 of 2</i>)	0	2007/10/30
DG6214000	1	PCB/PCBA, Altair 5 WUSB	0	2007/10/30
DG6214800	2	Bill of Material, Altair 5 WUSB-Module	0	2007/08/03
10051985	1	<i>Screw, Hex, Button Head, SST, Battery Pack</i>	0	2003/10/28
7-7101-1	1	Battery Assembly, Potted, Rechargeable, Altair5	1	2008/09/19
10088655	1	<i>D-Ring, SST</i>	0	2007/09/10
10088613	1	Clamp, D-Ring, Altair5iR	1	2009/02/09
10095899	3	Label, Rechargeable Battery Pack, Altair5	0	2008/07/09
10099649	1	Printed Circuit Board, Color Display, Global Altair5	0	2009/04/23
10099650	4	Color Display Assembly, Global, Altair5	3	2009/06/01
SK3014-1013	1	Wiring Schematic, P.C. Board Assembly, Color Display, Global Altair5	0	2009/04/23
10083510	1	Box, Potting, Display, Color, Lower, Altair5	0	2008/09/19
10083571	1	Box, Potting, Display, Color, Upper, Altair5	0	2008/09/19
10080500	1	Printed Circuit Board, Altair5 Mono Display	5	2008/08/15
10080501	1	Printed Circuit Board Assembly, Altair5 Mono Display	6	2008/08/15
SK3014-1007	1	Wiring Schematic, Printed Circuit Board Assembly, Altair5 Mono Display	3	2008/08/15
10081552	1	Display Monochrome Graphic, Altair5	4	2008/09/19
10083460	1	Mount, Display, Monochrome, Altair5	1	2008/09/19
10083573	1	Bracket, Display, Monochrome, Altair5	0	2008/09/19
7-7098-1	1	Case, Upper, Molded, Altair5	4	2008/09/30
10083574	1	Bracket, Sensor, Altair5	2	2008/09/19
10083593	1	Gasket, Sensor, Altair5	0	2008/09/19
10083459	1	Membrane Sensor, Altair5	1	2008/09/19
10090108	1	Membrane, Sensor, Reactive Gas, Altair5	1	2009/04/08
10083580	1	Cap, Pump, Altair5	2	2008/09/19
SK3073-1058	1	Wiring Schematic, P.C. Board Assembly, Rechargeable, Altair5iR	1	2009/05/01
SK3098-1130	3	Artwork, Australian Approvals, Altair 5iR	0	2009/07/24

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Document No.	Sheets	Document Title	Issue	Date
10078704	2	Printed Circuit Board Assembly, Main, Altair5 iR	9	2009/05/01
10089398	1	Bracket, IR Sensor, Altair-iR	2	2009/04/08
10097335	1	Shield, IR Sensor, Altair iR	1	2009/05/20
10085923	1	Printed Circuit Board, Rechargeable, Altair5iR	3	2009/05/01
10078701	1	Printed Circuit Board Assembly, Rechargeable, Altair5iR	1	2009/05/01
7-7112-1	1	Battery Pack Assembly, Rechargeable, Altair5iR	1	2009/05/20
10088610	1	Bracket Assembly, Pump, Altair5iR	1	2009/04/24
10088611	1	Case, Lower, Molded, Altair5iR	2	2009/04/27
10088614	1	Door, Battery Pack, Rechargeable, Altair5iR	2	2009/04/27
DG 6207 583	3	Main, MCIR-Sensor (<i>Schematic</i>)	3	2006/02/01
DG 6207 983	7	MCIR-Sensor-Board (<i>PCB/PCBA</i>)	3	2006/02/01
DG 6207 483	8	Bill Of Material, MCIR-Sensor-Board	3	2006/02/01

Schedule of Variations

Variations Permitted by Issue 1:

- Removed Firmware page (page 4 of 4) from drawing 10099650 – Color Display Global Assembly Altair5.

This change did not affect the intrinsic safety assessment of the product. No test report required.

Condition of Certification Relating to Issue 1:

The conditions of certification are unchanged from the issue 0 of the certificate.

Drawings Relating to Issue 1:

Document No.	Sheets	Document Title	Issue	Date
10099650	3	Color Display Assembly, Global, Altair5	4	2009/09/29

Variations Permitted by Issue 2:

- The pump filtering structure has some changes – removal of the filter, shorten length of the tube. These changes are shown on the drawing 10088610.

These changes are assessed in Test Report AU/TSA/ExTR10.0043/00.

Condition of Certification Relating to Issue 2:

The conditions of certification are unchanged from the issue 0 of the certificate.

Drawings Relating to Issue 2:

Document No.	Sheets	Document Title	Issue	Date
10088610	1	Bracket Assembly, Pump, Altair5iR	2	2010/05/27

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Variations Permitted by Issue 3:

Addition of Altair 5X iR Multi-gas Detector: This is a 6 Gas instrument. It contains one dual XCell toxic electrochemical cell, one single XCell toxic electrochemical cell, one XCell combustible cell, one XCell oxygen electrochemical cell, and an infrared sensor. One electrochemical sensor bay can be fitted either with a XCell electrochemical cell or a 20 mm electrochemical cell.

The Ex code for the apparatus as follow:

Altair 5X iR
 Ex d ia I IP65 (Zone 1)
 Ex d ia IIC T4 IP65 (Zone 1), Tamb = -40°C to +50°C

Conditions of Certification pertaining to Issue 3 of this Certificate:

The conditions of certification are unchanged from the issue 0 of the certificate.

Drawing list pertaining to Issue 3 of this Certificate:

Document No.	Sheets	Document Title	Issue	Date (yyyy/mm/dd)
SK3098-1187	66	TestSafe Approvals, Altair5X /Altair5X iR	0	2011/03/07

Variations Permitted by Issue 4:

The following are changes in regards to adding alternate battery pack part numbers of identical construction and materials with differences on colour of the overmold only.

On Sheet 2 of Drawing SK3098-1187 revision 0 to revision 1:

- Changed from "NUMBER 10093415" to "NUMBERS 10093415 OR 10114838"
- Changed from "NUMBER 10083507" to "NUMBERS 10083507 OR 10114837"
- Changed from "NUMBER 10083508" to "NUMBERS 10083508 OR 10114836"
- Changed from "NUMBER 10090521" to "NUMBERS 10090521 OR 10114835"
- Changed from "NUMBER 10093416" to "NUMBERS 10093416 OR 10114851 OR 10114852"
- Changed from "NUMBER 10088522" to "NUMBERS 10088522 OR 10114839 OR 10114840"

On Sheet 62, added "OR ALTAIR5X" next to "ALTAIR5" for item 2 (battery pack door)

On Sheet 63, added "OR ALTAIR5X" next to "ALTAIR5" for item 1 (battery pack door)

On Sheet 64, added "OR ALTAIR5X" next to "ALTAIR5" for item 10 (battery pack door)

These changes were assessed in Test Report AU/TSA/ExTR11.0018/00.

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Conditions of Certification pertaining to Issue 4 of this Certificate:

The conditions of certification are unchanged from the issue 0 of the certificate.

Drawing list pertaining to Issue 4 of this Certificate:

Document No.	Sheets	Document Title	Issue	Date (yyyy/mm/dd)
SK3098-1187	66	TestSafe Approvals, Altair5X /Altair5X iR	1	2011/03/25

Variations Permitted by Issue 5:

The changes are described in their Agency Change Request 490298 and 490316.

In the Main Board, resistor R94 changed from 10 Ω 0.5 W to 110 Ω 0.75 W.

The following are changes made to the design documentation. These relate to deleting a via, minor change to layout of tracks, increasing track width, and designator changes.

Drawing SK3098-1187 revision 1 to revision 2:

1.) Sheet 14:

- a.) Previous R88 designator changed to R114, and, previous R114 designator changed to R88
- b.) Previous R85 designator changed to R112, and, previous R112 designator changed to R85.
- c.) Trace was thickened between D26 to D24.
- d.) Previous D18 designator changed to D20, previous D19 designator changed to D18, and previous D20 designator changed to D19.

2.) Sheets 16 through 23: Describes the revised alternate main printed circuit board artwork and component placement, for p/n 10105252 Revision 3, and the changes made are as follows:

- a.) Sheets 16 to 23: Typographical error references to part number 10105250 were changed to 10105252.
- b.) Sheet 21: corrected the typographical error in the naming of the PCB layer description from INNER 4 to BOTTOM.
- c.) Sheet 20: The tracks on inner layer 4 were shifted to provide greater segregation around one ground 'via'.
- d.) Sheet 21: One portion of the 'ground' track on the bottom layer was removed, and the corresponding 'via' to this deleted track was deleted throughout the other layers (on sheets 16 to 20).
- e.) All references to revision of the artwork were changed from Revision 2 to Revision 3.

3.) All sheets: the revision date in the title block was revised to, 24-June-2011, and the revision number changed from Revision 1 to Revision 2.

These changes were assessed in Test Report AU/TSA/ExTR11.0045/00.

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Conditions of Certification pertaining to Issue 5 of this Certificate:

The conditions of certification are unchanged from the issue 0 of the certificate.

Drawing list pertaining to Issue 5 of this Certificate:

Document No.	Sheets	Document Title	Issue	Date (yyyy/mm/dd)
SK3098-1187	66	TestSafe Approvals, Altair5X / Altair5XiR	2	2011/06/24
SK3073-1048	4	Wiring Schematic, Altair5 Main Board	5	2011/06/21
10102322	2	Printed Circuit Board Assembly, Main, Global Altair5	2	2011/06/21
10078704	2	Printed Circuit Board Assembly, Main, Global Altair5IR	10	2011/06/21

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