Gas detectors

Certificate N°: BAM/ZBA/008/04

Hereby it is certified by the BAM Certification Body that the

Portable gas detector

Model: „GasAlertMicro"

Types : „GAMIC-X(y)-(DL2-IR)" with Oxygen sensor

of the manufacturer BW Technologies Ltd.
2840 – 2nd Avenue S.E., Calgary, Alberta, Canada T2A 7X9

meets the requirements of the following standards:

EN 50104:2002	*„Electrical apparatus for the detection and measurement of oxygen – Performance requirements and test methods"*
EN 50271:2001	*„Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen – Requirements and tests for apparatus using software and/or digital technologies "*

The type of construction of the apparatus and special conditions for safe use of the gas detector are given in the Annex to this Certificate. The results of the Type examination are provided in the confidential test report BAM II-4146/2003 of December 15th, 2004.

The certification covers a Type examination and a regular manufacturer facility surveillance on the basis of DIN EN 45 011:1998 (BAM Certification system I). The procedure for the certification is laid down in contract BAM-ZBA-0013-2004-BW Technologies.

The manufacturer declares conformity of the manufactured products with the product certified by BAM and may use the BAM certification signs „BAM Baumustergeprüft" respectively "BAM Design-type tested" in addition with the certificate N°.

The certificate is valid for 3 years as of date of issue.

Bundesanstalt für Materialforschung und –prüfung (BAM)
D-12200 Berlin, December 20th, 2004

Dr. rer. nat. R. Schmidt
BAM Certification Body

Dr. rer. nat. V. Lohse
Technical Expert and Assessor

Distribution list: 1st Manufacturer 2nd BAM Certification Body

BAM is an accredited Certification Body by DAP Deutsches Akkreditierungssystem Prüfwesen GmbH according to DIN EN 45 011. The accreditation applies to the scope of certification specified in the certificate DAP-ZE-2614.15.

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Description of the apparatus

The GasAlertMicro is a group II gas detector intended for use in potentially explosive atmospheres, without oxygen measuring function for explosion protection (Supervision of measures for inertisation - inert gas purging) according to Directive 94/9/EC, Annex II, Chapter 1.5 (ATEX 95).

The gas detector GasAlertMicro is a portable, explosion-proofed gas detector which can be fitted with Alkaline batteries or alternatively with rechargeable NiMH accumulators. The GasAlertMicro has 3 sensor plug-in positions and the tested apparatus was fitted with a sensor for measuring combustible gases, an oxygen sensor and a CO & H_2S dual sensor. Gas reaches the sensor by diffusion.
The GasAlertMicro may be equipped with a variable number of sensors which are selected by the implemented software in the menu "User Options". All apparatus types GAMIC-X(y)-(DL2-IR) are equipped with the same software version „bb", the same parameter memory EEPROM version „J" and the same hardware, except for the fitted sensors and the implemented MMC adapter, if applicable.

The oxygen sensor of the GasAlertMicro operates on the electrochemical principle.

The measuring channel for the measurement of oxygen is equipped with two adjustable alarm thresholds, which are adjustable both below, both above or respectively one above and one below the air oxygen value of 20.9 % (v/v). Below 20.9 % (v/v) oxygen the alarm is activated when the concentration falls below an alarm threshold value. Above 20.9 % (v/v) oxygen the alarm is activated when the concentration exceeds an alarm threshold value. The alarm operation is therefore not suitable for the supervision measurements for inertisation in the context of explosion protection. The apparatus is delivered with non-latching alarms, although these may be configured to latching alarms by the user. The alarm output is given visually, acoustically, by indication in the graphic display and as vibration alarm.

O_2 Sensors:	a) City 4OX(2), City Technology Limited b) Alphasense O2-A2, Alphasense Limited
Batteries:	a) Alkaline Battery Duracell MN1500 b) NiMH-Accumulator Quest HG1600AACS c) Rechargeable Battery Pack NiMH (GAMicro Batt) GAMIC-BAT-03

Test report BAM II-4146/2003 of December 15th, 2004

The test report comprises 59 pages and 32 annexes with 931 pages.

Examination documents:

1. Quick Reference Guide GasAlertMicro D5554/4 (English), 2004, 20 pages
2. GasAlertMicro ATEX Approval Label with drawing No.GMIA-25F of March 30th, 2004, GasAlertMicro BAM Certification Sticker GMIA-322 of October 14th, 2003 and BAM CalGas Label with drawing No. FXUA 09 C of April 2nd, 2004, 3 pages
3. GasAlertMicro Assembly with drawing No. GMID-40D, 1 page
4. GasAlertMicro Plastic Assembly with drawing No. GMID-65A, 1 page
5. GasAlertMicro Battery retaining screw, 1 page

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6. GasAlertMicro, Overview with drawing No. GMIW-01Q of March 26th, 2004, 1 page
7. Primary Micro controller with in-circuit program option with drawing No. GMIW-05Q of March 26th, 2004, 1 page
8. I2C/SPI Interface circuitry, voltage reference with drawing No. GMIW-10Q of March 26th, 2004, 1 page
9. Sensor circuitry – H_2S- and CO-Dual gas sensor with drawing No. GMIW-15Q of March 26th, 2004, 1 page
10. Sensor circuitry – LEL- and O2-Sensor with drawing No. GMIW-20Q of March 26th, 2004, 1 page
11. Temperature sensing, Battery and light monitor with drawing No. GMIW-25Q of March 26th, 2004, 1 page
12. Keypad and main power supply control with drawing No. GMIW-30Q of March 26th, 2004, 1 page
13. Main power supply and Battery PCB with drawing No. GMIW-35Q of March 26th, 2004, 1 page
14. Step-up speaker power supply with drawing No. GMIW-40Q of March 26th, 2004, 1 page
15. LCD Display with drawing No. GMIW-45Q of March 26th, 2004, 1 page
16. Visual indicators and Vibrator with drawing No. GMIW-50Q of March 26th, 2004, 1 page
17. Audible indicators with drawing No. GMIW-55Q of March 26th, 2004, 1 page
18. IR Communications with drawing No. GMIW-60Q of March 26th, 2004,1 page
19. Multimedia Card datalogger, EEPROM Memory and real time clock with drawing GMIW-65Q of March 26th, 2004, 1 page
20. Parts list GasAlertMicro Non-Datalogger PCB with Revision Level 110748, 9 pages
21. Part list GasAlertMicro Datalogger PCB with Revision Level 110959, 9 pages
22. Layout - Layer descriptions PCB with identification Gmig-10g of August 8th, 2002, 8 pages
23. EC Declaration of Conformity with Directive 94/9/EG (ATEX) and Directive 89/336/EWG (EMC) of April 1st, 2003, 1 page
24. GasAlertMicro Software & digital technologies, Revision C, December 13th, 2004, 7 pages
25. Declaration of manufacturer for the use of hardware components within her specifications according to EN 50271, October 26th, 2004, 1 page
26. Software program listing rev "bb", Revision stand March 23rd, 2004, 837 pages
27. EC Type Examination Certificate with number LCIE 03 ATEX 6091 X of May 6th, 2003 with 2 additions, 5 pages
28. Technical specification Oxygen Sensor 4OX(2)-Oxygen CiTicel®, City Technology Ltd. with identification 4ox2.pmd Issue 1.5 of August 3rd, 2001, 2 pages
29. Technical specification O2-A2 Oxygen Sensor, Alphasense Ltd. with identification TDS/O2A2/101, 2 pages

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Special conditions for safe use:

1. For a safe use, it is necessary to obey the indications of the user manual of the GasAlertMicro.

2. The following climatic ranges of use apply for the use of GasAlertMicro with oxygen sensor:

Temperature:	-20 °C to +50 °C
Relative humidity:	5 % to 95 %
Pressure:	80 kPa to 120 kPa

   (extended range of use for temperature and humidity compared to EN 50104)

3. The ambient conditions (temperature, pressure, humidity) during the calibration of the measuring channels should get close as possible to these under operating conditions in order to minimise the measuring errors.

4. Measuring values from 20.6 % (v/v) up to 21.2 % (v/v) are indicated as "20.9" % (v/v) oxygen during the measuring operation.

5. In case interfering admixtures, which may cause a rapid lost of sensitivity are to be expected in the atmosphere to be monitored, this must be taken into account for specification of the calibration intervals.

6. Before using the gas detector, it must be checked whether the alarm delay time for the safety related measurement is sufficiently low to ensure that protective measures to be carried out after an alarm can be executed in time to avoid dangerous situations.

7. Cross sensitivities described in the sensor data sheet have to be considered.

8. Some types and concentration of dust in the measured atmosphere may impair the measuring function of the gas detector.

9. The battery slide-in unit has to be fixed with the retaining screw. After an impact the detector has to be checked on function ability.

10. The gas detector shall be brought in a hazardous area only if it is switched on.

11. If the discharge limit of the battery is reached and signalled, the hazardous area to be monitored shall be left immediately.

12. The Type Examination Certificate applies to the measurement of oxygen up to 25 % (v/v).

Additional informations:

This Type Examination Certificate covers the examination of the oxygen measuring function on the basis of EN 50104 and the test of the installed software and the used digital technologies in the gas detector to EN 50271. This Type examination certificate applies to apparatus with installed software version "bb" and the parameter memory EEPROM version „J". The Datalogger functions of equipment types with data logging options are not covered by this Type examination certificate.

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The manufacturer shall inform the notified body (BAM) of all modifications of the approved equipment, as far as the product modifications could effect the conformity with the essential requirements or the prescribed conditions for use of the gas detector and which requires further approval.

Bundesanstalt für Materialforschung und –prüfung (BAM)
D-12200 Berlin, December 20th, 2004

Dr. rer. nat. R. Schmidt
BAM Certification Body

Dr. rer. nat. V. Lohse
Technical Expert and Assessor

1st Addition

to Type Examination Certificate BAM/ZBA/008/04

(Type examination of the Oxygen measuring function)

Equipment:	Portable Gas Detector Model **GasAlertMicro** Types GAMIC-4 and GAMIC-4-DL2-IR
Manufacturer:	BW Technologies Ltd.
Address:	2840 – 2nd Avenue S.E., Calgary, Alberta, Canada T2A 7X9

Description of changes and additions:

Changes/Additions:	Software update to version „AJ " and update of EEPROM parameter memory to version "O" with implementation of a new battery management and addition of user options "Micro-bat" and "Bump due".
Conformity with:	EN 50104 (April 2002) and EN 50271 (November 2001)
Test report:	BAM II-1367/2005

For **Bundesanstalt für Materialforschung und –prüfung (BAM)**

D-12200 Berlin, March 23rd, 2006

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2nd Addition

to Type Examination Certificate BAM/ZBA/008/04

(Type examination of the Oxygen measuring function)

Equipment:	Portable Gas Detector Model **GasAlertMicro** Types GAMIC-4 and GAMIC-4-DL2-IR
Manufacturer:	BW Technologies by Honeywell
Address:	2840 – 2nd Avenue S.E., Calgary, Alberta, Canada T2A 7X9

Description of changes and additions:

Changes/Additions:	Software update to version „AU" and EEPROM parameter memory version "O".
Conformity with:	EN 50104 (April 2002) and EN 50271 (November 2001)
Test report:	BAM II-3246/2006

For **Bundesanstalt für Materialforschung und –prüfung (BAM)**

D-12200 Berlin, June 21st, 2007

Dr. rer. nat. R. Schmidt
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CERTIFICATE

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