Gas detectors

Certificate N°: BAM/ZBA/006/05

Hereby it is certified by the BAM Certification Body that the

Portable gas detector

Model: „GasAlertMicro"

Types : „GAMIC-X(y)-(DL2-IR)" with H_2S & CO 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 45544-1:1999 *„Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours – Part 1: General requirements and test methods"*

EN 45544-2:1999 *„Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours – Part 2: Performance requirements for apparatus used for measuring concentrations in the region of limit values"*

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"*

and the requirements of the Leaflet of the German Professional associations of the chemical industry T 021 (BGI 836) „Gaswarneinrichtungen für toxische Gase, Dämpfe und Sauerstoff; Einsatz und Betrieb", Section 3 (August 2002) with regard to the hydrogen sulphide and the carbon monoxide measuring function.

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-1332/2004 of August 5th, 2005.

The certification covers a Type examination 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 has a validity of 3 years beginning with the date of issue.

On behalf of **Bundesanstalt für Materialforschung und –prüfung (BAM)**
D-12200 Berlin, September 6th, 2005

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

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

1st copy: BW Technologies Ltd.
2nd copy: 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-02.614-15-98-00.

This Certificate may be reproduced only in full wording and unchanged, including the Annex. Legally enforceable is only the Certificate in German language.

Annex to the
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Description of the apparatus

The tested gas detector GasAlertMicro is a portable, explosion protected gas detector with rechargeable battery and is fitted with a double sensor for the measurement of carbon monoxide and hydrogen sulphide. The gas detector is intended for use for warning against dangerous concentrations of carbon monoxide and hydrogen sulphide in air.

The double carbon monoxide and hydrogen sulfide sensing head of GasAlertMicro works on the electrochemical principle.

The GasAlertMicro is provided with two adjustable alarm thresholds (LOW and HIGH alarm) per measuring channel, which are adjustable within the measuring range. The delivery of the apparatus to the customers is carried out with non-latching alarms, the alarms however may switch by the user to be latching alarms. The alarm output is carried out visually, acoustically, by vibration and by indication on the graphic display.

Sensor:	4COSH CiTiceL®, City Technology Ltd., UK and BW20-4COH2S, BW Technologies Ltd.
Battery:	a) Alkaline-Battery Duracell MN1500 b) NiMH Accumulator Quest HG1600AACS c) Rechargeable Battery Pack (GAMicro Batt) GAMIC-BAT-03 and GAMIC-BAT2-03
Accessories:	Battery charger Model GAMIC-C01-K-EU and GAMIC-C03-K-EU

Test report BAM II-1332/2004 of August 5th, 2005

The test report comprises 51 pages and 30 annexes with 847 pages.

Examination documents:

1. Quick Reference Guide GasAlertMicro D5554/4 (English) in the version of 2004, 20 pages
2. GasAlertMicro ATEX Approval Label with drawing No.GMIA-25I of April 25th, 2005, GasAlertMicro BAM Certification Sticker GMIA-32B of September 8th, 2005 and BAM CalGas Label with drawing No. FXUA 09 C of April 2nd, 2004, 3 pages
3. GasAlertMicro Assembly with drawing No. GMID-40D of November 28th, 2002, 1 page
4. GasAlertMicro Plastic Assembly with drawing No. GMID-65A of February 10th, 2003, 1 page
5. GasAlertMicro Battery retaining screw, 1 page
6. GasAlertMicro Summery 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

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9. Sensor Circuitry – H_2S- und CO-Dual gas sensor with drawing No. GMIW-15Q of March 26th, 2004, 1 page
10. Sensor Circuitry – LEL- and O_2-Sensor with drawing No. GMIW-20Q of March 26th, 2004, 1 page
11. Temperature sensing, Light and Battery monitor with drawing No. GMIW-25Q of March 26th, 2004, 1 page
12. Keypad and power supply control with drawing No. GMIW-30Q of March 26th, 2004, 1 page
13. Main Power supply and Battery PCB GMIW-35Q of March 26th, 2004, 1 page
14. Set-up speaker power supply with drawing No. GMIW-40Q of March 26th, 2004, 1 page
15. LC-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 GMIW-65Q of March 26th, 2004, 1 page
20. Part list PCB GasAlertMicro Non Datalogger, Revision level 110748, 9 pages
21. Part list PCB GasAlertMicro with Datalogger, Revision level 110959, 9 pages
22. Layout PCB with identification Gmig-10g of August 8th, 2002, 8 pages
23. Declaration of Conformity with Directive 94/9/EG (ATEX) and 89/336/EWG (EMC) of April 1st, 2003, 1 page
24. GasAlertMicro Software & digital Technologies, Revision C, December 13th, 2004, 7 pages
25. Manufacturer declaration of conformity according to EN 50271 for the use of the hardware components within her specifications of October 26th, 2004, 1 page
26. EC-Type Examination Certificate with number LCIE 03 ATEX 6091 X of May 6th, 2003 with 4 additions, 9 pages
27. Software Source code listing „AJ", Revision level December 20th, 2004, 757 pages
28. Technical specification CO&H_2S-Sensor BW20-4COH2S, BW Technologies, Data sheet of May 20th, 2004, 2 pages
29. Technical specification CO&H_2S-Sensor, City 4COSH rev3 City Technology Ltd. with identification 4coshrev03.pmd of October 31st, 2003, 2 pages
30. Sensor Configurations and Component Specification Sheet for Toxic gas sensors, BW Technologies Ltd. with identification Mx2g-67a, Revision January 12th 2001, 2 pages

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Special conditions for safe use

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

2. The following climatic ranges of use are valid for the use of CO&H_2S double sensor in GasAlertMicro:
   Temperature: -20°C to +50°C (H_2S: above approx. 40 °C a relative humidity of at least 20% is required)
   Relative humidity: 5% to 95% at 20 °C
   Pressure: 90 kPa to 110 kPa
   (extended range of use for temperature and humidity compared to EN 45544)

3. The surrounding conditions (temperature, pressure, humidity) during the calibration of the measuring channels should get close if possible to these under operating conditions for the minimisation of measuring errors.

4. Carbon monoxide measuring values from –3 ppm (v/v) up to +3 ppm (v/v) and hydrogen sulphide measuring values from –2 ppm (v/v) up to +1 ppm (v/v) are indicated during measuring operation as "0" ppm (v/v).

5. Before using the gas detector, it must be checked that 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 quickly enough to avoid dangerous situations.

6. The cross sensitivities described in the sensor data sheet are to be considered.

7. Some types and concentration of dust in the measuring gas can impair the functional ability of the gas detector.

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

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

10. The Type Examination Certificate applies to the measurement of carbon monoxide in the measuring range from 3 ppm (v/v) up to 500 ppm (v/v) for both sensor types and the measurement of hydrogen sulphide in the measuring range of
    1 ppm (v/v) to 100 ppm (v/v) for sensor type BW20-4COH2S or
    2 ppm (v/v) to 100 ppm (v/v) for sensor type 4COSH CiTiceL® rev.3.

11. H_2S overranging is shown on the display above approx. 120 ppm H_2S as "OL". High CO concentrations above the top of the measuring range are not indicated as "OL" at same concentrations at all tested specimens. The specimens don't displayed the accurate high CO concentrations in all cases before "OL" indication.

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Additional Informations

This Type Examination Certificate covers the examination of the carbon monoxide and hydrogen sulphide measuring function on the basis of EN 45544 Part 1 and 2 and the test of the installed software and the used digital technologies in the gas detector GasAlertMicro to EN 50271. This Type examination certificate applies to apparatus with installed software version „AJ" and EEPROM-Version „O".

The Datalogger functions of equipment type GAMIC-4-DL2 are not covered by this Type examination certificate.

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 which the prescribed conditions for use of the gas detector and which requires further approval.

On behalf of **Bundesanstalt für Materialforschung und –prüfung (BAM)**

D-12200 Berlin, September 6th, 2005

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1st Addition

to Type Examination Certificate N°: BAM/ZBA/006/05

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:	Software update to version „AU" and EEPROM parameter memory version "O".
Conformity with:	EN 45544-1 and -2 (1999) for the measurement of hydrogen sulphide and the carbon monoxide (H_2S and CO), EN 50271 (November 2001) and the requirements of Leaflet T 021 (BGI 836) of the German Professional associations of the chemical industry „Gaswarneinrichtungen für toxische Gase, Dämpfe und Sauerstoff; Einsatz und Betrieb", Section 3 (August 2002) with regard to the hydrogen sulphide and the carbon monoxide measuring function.
Test report:	BAM II-3246/2006

For **Bundesanstalt für Materialforschung und –prüfung (BAM)**
D-12200 Berlin, June 21st, 2007

BUNDESANSTALT FÜR MATERIALFORSCHUNG UND -PRÜFUNG (BAM) 51

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CERTIFICATE

2000-2