

CERTIFICATE

on Product Conformity (QAL1)

Number of Certificate: 0000034862

Certified AMS: Gaschromatograph GC 5000 BTX Type FID for Benzene

Manufacturer: AMA Instruments GmbH
Söflinger Straße 100
89077 Ulm
Germany

Test Institute: TÜV Rheinland Energie und Umwelt GmbH

**This is to certify that the AMS has been tested
and found to comply with:**

EN 14662-3: 2005, EN 15267-1: 2009, EN 15267-2: 2009

Certification is awarded in respect of the conditions stated in this certificate
(also see the following pages).



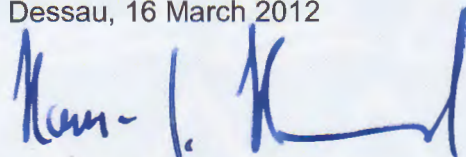
- Certified equivalent EN method
- Complying with 2008/50/EC
- TUV approved
- Annual inspection

Publication in the German Federal Gazette
(BAnz.) of 25 August 2009

The certificate is valid until:
01 March 2017

Umweltbundesamt
Dessau, 16 March 2012

TÜV Rheinland Energie und Umwelt GmbH
Köln, 15 March 2012



i. A. Dr. Hans-Joachim Hummel



ppa. Dr. Peter Wilbring

www.umwelt-tuv.de / www.eco-tuv.com
teu@umwelt-tuv.de
Tel. +49 221 806-2756

TÜV Rheinland Energie und Umwelt GmbH
Am Grauen Stein
51105 Köln

Accreditation according to EN ISO/IEC 17025 and certified according to ISO 9001:2008.

Certificate:
0000034862 / 16 March 2012

Test report: LUBW-Report No. 143-02.R1/09 of 08 June 2009
First certification: 02 March 2012
Validity ends: 01 March 2017
Publication: BAnz. 2009, No. 125, p. 2929, chapter II, No. 3.1

Approved application

The certified AMS is suitable for continuous ambient air monitoring (stationary operation).

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a more than three months field test at a traffic related location.

The AMS is approved for a temperature range of +5 °C to +35 °C.

Any potential user should ensure, in consultation with the manufacturer that this AMS is suitable for ambient air applications at which it will be installed.

Basis of the certification

This certification is based on:

- Test report 143-02.R1/09 dated 08 June 2009 of Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg (LUBW), Karlsruhe
- suitability announced by the German Environmental Agency (UBA) as the relevant body
- the ongoing surveillance of the product and the manufacturing process
- publication in the German Federal Gazette (BAnz. 2009, No. 125, p. 2929, chapter II, No. 3.1, announcement by UBA from 03 August 2009)
- publication in the German Federal Gazette (BAnz. 02. March 2012, No. 36, page 920, chapter V, notification 13 as well as notification 21, announcement by UBA from 23 February 2012)

AMS name:

Gaschromatograph GC 5000 BTX Type FID for Benzene

Manufacturer:

AMA Instruments GmbH, Ulm

Approval:

For continuous ambient air monitoring of benzene concentration (stationary operation)

Measuring ranges during the suitability test:

Benzene 0 – 50 µg/m³

Software version:

GC 5000 BTX Version 1.1

Restriction:

The AMS does not have a living zero.

Remarks:

None

Test report:

Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg (LUBW), Karlsruhe
Report No. 143-02.R1/09 dated 8 June 2009

13 Notification on the announcement of the Federal Environment Agency of 3 August 2009
(BAnz. p. 2929, chapter II, number 3.1)

The current software version number of the GC 5000 BTX gas chromatograph in its FID version
for benzene manufactured by AMA Instruments GmbH is:

Version 2.1.

The measuring system can also be operated with a Mean Well PS-35-24 24V/1.5 A power supply
instead of the Mean Well PS-25-24 24V/1.0 A power supply.

Statement by TÜV Rheinland Energie und Umwelt GmbH dated 29 September 2011

21 Notification on the announcement of the Federal Environment Agency of 3 August 2009
(BAnz. p. 2929, chapter II, number 3.1)

The GC 5000 BTX measuring system in its FID version for benzene manufactured by AMA
Instruments GmbH for determining the concentration of benzene in ambient air meets the
requirements of DIN EN 14662-3 (August 2005).

Moreover, the manufacturing process and the quality management system of the 5000 BTX
measuring system in its FID version for benzene meet the requirements of DIN EN 15267.

The test report on the suitability test is accessible on the Internet at www.qal1.de.

Statement by TÜV Rheinland Energie und Umwelt GmbH dated 30 January 2012

Certificate:
0000034862 / 16 March 2012

Certified product

This certificate applies to automated measurement systems confirming to the following description:

Online Gaschromatograph GC 5000 BTX is developed for continuous measurement of benzene, toluene, m-/p-xylene, o-xylene, and Ozone precursors (C6 to C12) in ambient air.

The tested AMS is assembled in 19 inch housing with the following technical data:

Housing 19 inch

Height: 6 rack units (U)
Depth: 600 mm
Weight: approximately 33 kg
Ambient temperature range: 0 to 40 °C

Voltage and gas supply

Voltage: 220 – 250 VAC, 50 Hz
Power: max. 800 W
Carrier gas: N₂ 5.0 (12 ml/min)
Burning air: Synthetic air or catalytic purified compressed air
Burning gas: H₂ 5.0 (37 ml/min)
Gas connection: Swagelok, 1/8 inch
Detector: FID

Sampling system

Pump: Maintenance free diaphragm pump
Volume measurement: MFC – mass flow controller with thermal sensor
Sampling duration: 15 min
Sample flow rate: 20 ml/min (normal conditions, dry)
Sampling volume: 300 ml (normal conditions, dry)

Accumulation

Adsorber: Carbotrap
Accumulation temperature: 30 °C
Desorption temperature: 230 °C

Valve Oven

Temperature: 80 °C
Sample switch: 6-port-valve

Column Oven

Separating column: Quartz capillary column
AMAsep 1 - 0.32 mm ID/ 30 m 1.5 µm film
Temperature program: 50 °C 3 min, 8 °C/min, 130 °C 5 min
Oven cooling: Forced cooling by opening the column oven and air recirculation

Communication interfaces

Interfaces: 2 Ethernet, RS 232, RS 485, 4 USB, VGA
max. 16 analogue outputs (4 - 20 mA, 0 - 20 mA, 0 - 5 V, 0 - 10 V),
digital inputs/outputs, field bus connection
Protocols: Gesytec I (Bayern-Hessen), Gesytec II, Modbus RTU, others on request

Certificate:
0000034862 / 16 March 2012

General notes

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. The manufacturer is required to maintain an approved quality management system controlling the manufacture of the certified product. Both the product and the quality management systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energie und Umwelt GmbH must be notified at the given address on page 1.

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate. This can be applied to the product or used in publicity material for the certified product is presented on page 1 of this certificate.

This document as well as the certification mark remains property of TÜV Rheinland Energie und Umwelt GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the validity of the certificate and on requests of the TÜV Rheinland Energie und Umwelt GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and the validity is also accessible on the internet Address: **qal1.de**.

Certification of Gaschromatograph GC 5000 BTX Type FID for Benzene is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

First suitability test:

Test report: 143-02.R1/09 of 08 June 2009
Landesamt für Umwelt, Messungen und Naturschutz Baden-Württemberg
Publication: BAnz. 25 August 2009, No. 125, p. 2929, chapter II, No. 3.1
Announcement by UBA from 03 August 2009

Initial certification according to EN 15267:

Certificate No. 0000034862: 16 March 2012
Validity of the certificate until: 01 March 2017
Test report: 143-02.R1/09 of 08 June 2009
Landesamt für Umwelt, Messungen und Naturschutz Baden-Württemberg
Publication: BAnz. 02 March 2012, No. 36, p. 920, chapter V, notification 13 as well as notification 21
Announcement by UBA from 23 February 2012

Certificate:
0000034862 / 16 March 2012

Gesamtmessunsicherheit für den Labortest		GC 5004	GC 5005		GC 5004	GC 5005
Unsicherheit des Prüfgases*	u_{span} [$\mu\text{g}/\text{m}^3$]	0,06	0,06	c_{Benz} [$\mu\text{g}/\text{m}^3$]	5,0	5,0
Anpassung der Kalibriergeraden	u_{fit} [$\mu\text{g}/\text{m}^3$]	0,07	0,05	c_{Benz} [$\mu\text{g}/\text{m}^3$]	14,0	14,0
Wiederholpräzision	u_r [$\mu\text{g}/\text{m}^3$]	0,08	0,06	c_{Benz} [$\mu\text{g}/\text{m}^3$]	5,9	5,9
Störung durch Ozon	u_{O_3} [$\mu\text{g}/\text{m}^3$]	0,01	0,02	c_{Benz} [$\mu\text{g}/\text{m}^3$]	41,7	41,7
Störung durch organische Verbindungen	u_{org} [$\mu\text{g}/\text{m}^3$]	0,14	0,20	c_{Benz} [$\mu\text{g}/\text{m}^3$]	41,7	41,7
Störung durch relative Feuchte	u_{rh} [$\mu\text{g}/\text{m}^3$]	0,15	0,09	c_{Benz} [$\mu\text{g}/\text{m}^3$]	41,7	41,7
Abhängigkeit vom Luftdruck	u_p [$\mu\text{g}/\text{m}^3$]	0,03	0,16	c_{Benz} [$\mu\text{g}/\text{m}^3$]	41,8	41,8
Abhängigkeit von der Umgebungstemperatur	u_{T_2} [$\mu\text{g}/\text{m}^3$]	0,31	0,10	c_{Benz} [$\mu\text{g}/\text{m}^3$]	38,1	38,1
Abhängigkeit von der Spannung	u_v [$\mu\text{g}/\text{m}^3$]	0,13	0,01	c_{Benz} [$\mu\text{g}/\text{m}^3$]	41,7	41,7
Gesamtmessunsicherheit u_c/c [%]		2,2	1,8			
Erweiterte Messunsicherheit $U_{c,rel}$ [%]		4,3	3,6			

*: Die Unsicherheit der Prüfgaserzeugung liegt bei $\pm 2,5\%$ (bez. auf $5 \mu\text{g}/\text{m}^3$). Standardverfahren über Jahre verifiziert

Gesamtmessunsicherheit für den Feldtest		GC 5004	GC 5005		GC 5004	GC 5005
Unsicherheit des Prüfgases*	u_{span} [$\mu\text{g}/\text{m}^3$]	0,06	0,06	c_{Benz} [$\mu\text{g}/\text{m}^3$]	5,0	5,0
Anpassung der Kalibriergeraden	u_{fit} [$\mu\text{g}/\text{m}^3$]	0,07	0,05	c_{Benz} [$\mu\text{g}/\text{m}^3$]	14,0	14,0
Vergleichsstandardabweichung	u_{ref} [$\mu\text{g}/\text{m}^3$]	0,14	0,14	c_{Benz} [$\mu\text{g}/\text{m}^3$]	41,8	41,8
Störung durch Ozon	u_{O_3} [$\mu\text{g}/\text{m}^3$]	0,01	0,02	c_{Benz} [$\mu\text{g}/\text{m}^3$]	41,7	41,7
Störung durch organische Verbindungen	u_{org} [$\mu\text{g}/\text{m}^3$]	0,14	0,20	c_{Benz} [$\mu\text{g}/\text{m}^3$]	41,7	41,7
Störung durch relative Feuchte	u_{rh} [$\mu\text{g}/\text{m}^3$]	0,15	0,09	c_{Benz} [$\mu\text{g}/\text{m}^3$]	41,7	41,7
Abhängigkeit vom Luftdruck	u_p [$\mu\text{g}/\text{m}^3$]	0,03	0,16	c_{Benz} [$\mu\text{g}/\text{m}^3$]	41,8	41,8
Abhängigkeit von der Umgebungstemperatur	u_{T_2} [$\mu\text{g}/\text{m}^3$]	0,31	0,10	c_{Benz} [$\mu\text{g}/\text{m}^3$]	38,1	38,1
Abhängigkeit von der Spannung	u_v [$\mu\text{g}/\text{m}^3$]	0,13	0,01	c_{Benz} [$\mu\text{g}/\text{m}^3$]	41,7	41,7
Langzeitdrift	u_d [$\mu\text{g}/\text{m}^3$]	0,17	0,27	c_{Benz} [$\mu\text{g}/\text{m}^3$]	41,8	41,8
Gesamtmessunsicherheit u_c/c [%]		1,7	1,6			
Erweiterte Messunsicherheit $U_{c,rel}$ [%]		3,4	3,2			

*: Die Unsicherheit der Prüfgaserzeugung liegt bei $\pm 2,5\%$ (bez. auf $5 \mu\text{g}/\text{m}^3$). Standardverfahren über Jahre verifiziert