

# CERTIFICATE

## On Product Conformity (QAL1)

Number of Certificate: LUBW001430001

**Certified AMS:** GC 955 version 601 (PID-Detector)

**Manufacturer:** Synspec B. V.  
De Deimten 1  
9747 AV Groningen  
The Netherlands

**Test Institute:** LUBW Landesanstalt für Umwelt, Messungen und Naturschutz  
Baden-Württemberg

**This is to certify that the automated measuring system (AMS)  
has been tested and found to comply with:**

**E EN 14662-3: 2013, EN 15267-1: 2009, EN 15267-2: 2009  
VDI-Richtlinie 4202 Blatt 1: 2010, VDI-Richtlinie 4203 Blatt 3: 2010**

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

Publication in the German Federal Gazette  
(BAnz.) of 05 August 2014

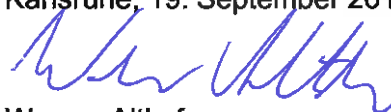
Umweltbundesamt  
Dessau, 24. September 2014



i. A. Dr. Marcel Langner

This certificate is valid until:  
04 August 2019

LUBW Landesanstalt für Umwelt, Messungen  
und Naturschutz Baden-Württemberg  
Karlsruhe, 19. September 2014



Werner Altkofer

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LUBW Landesanstalt für Umwelt, Messungen und Natur-  
schutz Baden-Württemberg  
Großoberfeld 3

	76135 Karlsruhe
Accreditation according to EN ISO/IEC 17025:2005	

**Test report:** 143-04/13 of 11 June 2014  
**First certification:** 13 August 2014  
**Validity ends:** 04 August 2019  
**Publication:** BAnz AT 05 August 2014 B11, chapter III, No. 1.1

**Approved application**

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

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

The AMS is approved for a temperature range of 0°C to 30°C.

Any potential user should ensure in consultation with the manufacturer, that the AMS is suitable for the planned application site.

**Basis of the certification**

This certification is based on:

- test report 143-04/13 dated 11 June 2014
- 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. AT 05 August 2014 B11, chapter III, No. 1.1, announcement by UBA from 17 July 2014)

**AMS name:**

Gaschromatograph GC 955 version 601 BTX type PID for benzene

**Manufacturer:**

Synspec B. V., Groningen (the Netherlands)

**Approval:**

Continuous ambient air monitoring of benzene concentration (stationary operation)

**Measuring ranges during the suitability test:**

<i>component</i>	<i>certificated range</i>	<i>measure unit</i>
benzene	0 - 50	µg/m <sup>3</sup>

**Software version:** 5.7.2

**Restriction:**

1. The AMS does not have a living zero.
2. The AMS shows a negative result for benzene under the influence of tetrachloromethane.

**Remarks:**

None

**Test Institute:**

Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg (LUBW), Karlsruhe

Report-No.: 143-04/13 of 11 June 2014

**Certified product:**

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

The gaschromatograph GC 955 version 601 (type PID) is an analyser for the continuous measurement of benzene, toluene, ethylbenzene, m/p- and o-xylene in ambient air with enriching sampling, thermal desorption and subsequent gas chromatographic separation.

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

**Housing 19 inch**

Height:	5 rack units (= 23,2 cm)
Depth:	37,2 cm
Weight:	17,4 kg

**Voltage and gas supply:**

Voltage:	230 V AC; 1, 3 -2, 6 A
Energy consumption:	2,16 kWh
Carrier gas:	Nitrogen N <sub>2</sub> 5.0
Gas connection:	Swagelok, 1/8 inch
Detector:	PID – Photo Ionization Detector (10,6 eV)

**Sampling system:**

Column type:	CP 70003; (Synspec SY-1)
Analytical column:	Length: 13 m
Stripper column:	Length: 2 m
Preconcentration system:	Tenax GR (manufacturer: Synspec)
10-way-valve:	DV 22-2110 (manufacturer: Vici)
Measuring cell volume:	50 µl
Sample volume:	4 piston strokes a 23,33 ml per cycle

**Communication:**

Interfaces:	4 analogue out 0 – 10 V oder 0(4) – 20 mA, 4 analogue in 0 – 10 V, 7 digital-outputs (TTL), 4 digital-inputs (TTL) Ethernet, 3 x RS232, 2 x USB, VGA
Protocols:	ASCII-terminal, Gesytec, ARIES, J-Bus, Profibus or Mod-Bus

**General notes:**

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

If a product of the current production does not correspond with the certified product, the Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg is to be informed at the given address on page 1.

This document remains property of the Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg. With revocation of the publication the certificate loses its validity. After the expiration of the validity of the certificate and on requests of the Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg this document shall be returned and the certificate shall no longer be used.

The relevant version of this certificate and the validity is also accessible on the internet address:  
[www.qal1.de](http://www.qal1.de)

Results of the laboratory and field tests of the Synspec GC 955 version 601 (PID) according to E EN 14662-3

Paragraph	Performance characteristics	Symbol	Performance criterion	results	benzene-conc. $C_{\text{benzene}}$ [ $\mu\text{g}/\text{m}^3$ ]	uncertainty $u$ [ $\mu\text{g}/\text{m}^3$ ]
8.4.3	Short term drift at span value (12 h)	$D_{s,s}$	$\leq 2,0 \mu\text{g}/\text{m}^3$	GC 2770: - 0,94 [ $\mu\text{g}/\text{m}^3$ ] GC 2771: - 1,25 [ $\mu\text{g}/\text{m}^3$ ]	37,5 37,5	- -
8.4.4	Repeatability at the annual limit value	$s_{r,c(t)}$	$\leq 0,25 \mu\text{g}/\text{m}^3$	GC 2770: 0,05 [ $\mu\text{g}/\text{m}^3$ ] GC 2771: 0,04 [ $\mu\text{g}/\text{m}^3$ ]	5,2 5,2	$u_r$ 0,016 $u_r$ 0,012
8.4.5	"Lack of fit", largest residual	$r_{\text{max}}$	$\leq 5 \%$	GC 2770: 1,7 [%] GC 2771: 4,2 [%]	2,4 2,4	$u_l$ 0,05 $u_l$ 0,12
8.4.6	Sensitivity coefficient for the influence of the sample gas pressure	$b_{\text{gp}}$	$\leq 0,10 (\mu\text{g}/\text{m}^3)/\text{kPa}$	GC 2770: 0,09 [ $(\mu\text{g}/\text{m}^3)/\text{kPa}$ ] GC 2771: 0,06 [ $(\mu\text{g}/\text{m}^3)/\text{kPa}$ ]	37,4 37,4	$u_{\text{gp}}$ 0,19 $u_{\text{gp}}$ 0,13
8.4.7	Sensitivity coefficient for the influence of the surrounding temperature	$b_{\text{st}}$	$\leq 0,08 (\mu\text{g}/\text{m}^3)/\text{K}$	GC 2770: 0,07 [ $(\mu\text{g}/\text{m}^3)/\text{K}$ ] GC 2771: 0,01 [ $(\mu\text{g}/\text{m}^3)/\text{K}$ ]	36,0 36,0	$u_{\text{st}}$ 0,16 $u_{\text{st}}$ 0,04
8.4.8	Sensitivity coefficient for the influence of the electrical voltage	$b_v$	$\leq 0,08 (\mu\text{g}/\text{m}^3)/\text{V}$	GC 2770: $< 0,01 [(\mu\text{g}/\text{m}^3)/\text{V}]$ GC 2771: $< 0,01 [(\mu\text{g}/\text{m}^3)/\text{V}]$	37,4 37,4	$u_v$ 0,02 $u_v$ $< 0,02$
8.4.9.2	Influence of the interference from relative humidity	$b_{\text{H}_2\text{O}}$	$\leq 0,015 (\mu\text{g}/\text{m}^3)/(\text{mmol}/\text{mol})$	GC 2770: -0,014 [ $(\mu\text{g}/\text{m}^3)/(\text{mmol}/\text{mol})$ ] GC 2771: -0,010 [ $(\mu\text{g}/\text{m}^3)/(\text{mmol}/\text{mol})$ ]	5,5 5,5	$u_{\text{H}_2\text{O}}$ -0,18 $u_{\text{H}_2\text{O}}$ -0,13
8.4.10	Carry over (Memory effect)	$C_m$	$\leq 1,0 \mu\text{g}/\text{m}^3$	GC 2770: 0,79 [ $\mu\text{g}/\text{m}^3$ ] GC 2771: 0,94 [ $\mu\text{g}/\text{m}^3$ ]	44,2 44,2	$u_m$ 0,05 $u_m$ 0,06
8.5.4	Long term drift	$D_{l,s}$	$\leq 10 \%$	GC 2770: -7,7 [%] GC 2771: -8,8 [%]	37,3 37,3	$u_{d,l,la}$ -0,22 $u_{d,l,la}$ -0,25
8.5.5	Reproducibility standard deviation	$s_{r,f}$	$\leq 0,25 \mu\text{g}/\text{m}^3$	GC 2770: 0,10 [ $\mu\text{g}/\text{m}^3$ ] GC 2771: -	-	$u_{r,f}$ 0,10
8.5.6	Maintenance interval		$> 14$ Tage	GC 2770: 28 Tage GC 2771: 28 Tage	-	-
8.5.7	Availability	A	$> 90\%$	GC 2770: 99,96 [%] GC 2771: 99,99 [%]	-	-

**Calculation of the uncertainty according to E EN 14662-3:**

**uncertainty for the laboratory tests:**

Paragraph	Performance characteristics	Symbol	Performance criterion	Results
8.6 / Annex E	combined standard uncertainty	$u_c$	-	GC 2770: 0,32 [ $\mu\text{g}/\text{m}^3$ ] GC 2771: 0,24 [ $\mu\text{g}/\text{m}^3$ ]
8.6 / Annex E	relative expanded uncertainty	W	< 25 %	GC 2770: <b>13,0 [%]</b> GC 2771: <b>9,7 [%]</b>

**uncertainty for the laboratory and field tests:**

Paragraph	Performance characteristics	Symbol	Performance criterion	Results
8.6 / Annex E	combined standard uncertainty	$u_c$	-	GC 2770: 0,41 [ $\mu\text{g}/\text{m}^3$ ] GC 2771: 0,37 [ $\mu\text{g}/\text{m}^3$ ]
8.6 / Annex E	relative expanded uncertainty	W	< 25 %	GC 2770: <b>16,3 [%]</b> GC 2771: <b>14,6 [%]</b>