

CERTIFICATE

On Product Conformity (QAL1)

Number of Certificate: LUBW001430001_04

Certified AMS: GC 955 Modell 601 (PID-Detector)

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

Test Institute: LUBW Landesanstalt für Umwelt
Baden-Württemberg

**This is to certify that the automated measuring system (AMS)
has been tested and certified according to the standards
EN 14662-3: 2016, EN 15267-1: 2009, EN 15267-2: 2023**

Certification is awarded in respect of the conditions stated in this certificate
(This certificate contains 13 pages).

This certificate replaces the certificate LUBW 001430001_03 from 20.05.2019

Publication in the German Federal Gazette
(BAnz.) of 5 August 2014

German Federal Environment Agency
Dessau, 7 November 2024



Dr. Marcel Langner
Head of Section II 4

This certificate is valid until:
4 August 2029

LUBW Landesanstalt für Umwelt
Baden-Württemberg
Karlsruhe, 6 November 2024



Dr. Ulrich Maurer

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LUBW Landesanstalt für Umwelt Baden-Württemberg
Großoberfeld 3
76135 Karlsruhe

Accreditation according to EN ISO/IEC 17025:2018

Test report:	143-04/13 of 11 June 2014 und Addendum SYN143-02/17 of 13.09.2017
Initial certification:	13 August 2014
Expiry date:	4 August 2029
Certificate:	Renewal (previous certificate LUBW 001430001_03 from 20 May 2019 valid until 4 August 2024)
Publication:	BAnz AT 5 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 based on 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.

The notification of suitability of the AMS, performance testing, and the uncertainty calculation have been effected based on the regulations valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure in consultation with the manufacturer that this AMS is suitable for monitoring the limit value relevant to the application

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 of 11 June 2014 and Addendum SYN143-02/17 of 13 September 2017
- 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 5 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:

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

Measuring ranges during the performance test:

<i>component</i>	<i>certificated range</i>	<i>measure unit</i>
benzene	0 - 50	µg/m³

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 tetrachloro-methane.

Test Institute:

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

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

Publication in the German Federal Gazette (BAnz AT 14 March 2016 B7, chapter V, notification 1, announcement by UBA from 18. February 2016):

1 Notification on the announcement of the Federal Environment Agency (UBA) from 17 July 2014 (BAnz AT 5 August 2014 B11, chapter III No. 1.1)

The AMS Gaschromatograph GC 955 version 601 type PID for benzene manufactured by Synspec B.V. was equipped with a new software:

V 6.0.9.1

As part of the introduction of the new software, the following hardware changes have been installed:

- New PC board: Nova-8522-G2-R10 Intel Celeron 600 MHz is replaced by *Nova PV-D5251-G2L2 Intel Atom 1.6GHz dual core*
- New HDD: Transend TS-32 GPSD 320 (29.8 GB) will be replaced by *Samsung ST 160 LM (160 GB)*
- New operating system: Windows XP will be replaced by *Windows 7*

Statement of Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg (LUBW) of 23 October 2015

Publication in the German Federal Gazette (BAnz AT 15 March 2017 B6, chapter V, notification 11, announcement by UBA from 22 February 2017):

11 Notification on the announcement of the Federal Environment Agency (UBA) from 17 July 2014 (BAnz AT 05 August 2014 B11, chapter III No. 1.1) and from 18 February 2016 (BAnz AT 14 March 2016 B7, chapter V, notification 1)

The AMS Gaschromatograph GC 955 version 601 type PID for benzene manufactured by Synspec B.V. was equipped with a new software:

V 6.1.4.0

In addition, the AMS can also be equipped with the following new hardware:

- Mass flow controller from Bronkhorst; Type: Maniflow 0 - 10 ml / min
- 2.5 inch SSD hard drive (SSDNow UV400 SATA 3/120 GB)

Statement of Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg (LUBW) of 15 September 2016

Publication in the German Federal Gazette (BAnz AT 26 March 2018 B8, chapter V, notification 3, announcement by UBA from 21 February 2018):

3 Notification on the announcement of the Federal Environment Agency (UBA) from 17 July 2014 (BAnz AT 5 August 2014 B11, chapter III No. 1.1) and from 22 February 2017 (BAnz AT 15 March 2017 B6, chapter V, notification 11)

The AMS Gaschromatograph GC 955 version 601 type PID for benzene manufactured by Synspec B.V. was equipped with a new software:

V 6.1.9.0

The AMS meets all the performance criteria required by DIN EN 14662-3 from 2016. An addendum to the test report with the report number SYN143-02/17 of 13 September 2017 is available on the internet at www.gal1.de

Statement of Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg (LUBW) of 13 September 2017 and Addendum to the test report 143-04/13 of 11 June 2014 of Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg (LUBW) of 13 September 2017

Publication in the German Federal Gazette (BAnz AT 26 March 2019 B7, chapter IV, notification 76, announcement by UBA from 27 February 2019):

76 Notification on the announcement of the Federal Environment Agency (UBA) from 17 July 2014 (BAnz AT 5 August 2014 B11, chapter III No. 1.1) and from 21 February 2018 (BAnz AT 26 March 2018 B8, chapter V, notification 3)

The AMS Gaschromatograph GC 955 version 601 type PID for benzene manufactured by Synspec B.V. was equipped with a new software:

V 6.2.2.0

In addition, the AMS can also be equipped with the following new hardware:

- New PCB (printed circuit board) with SMD components for the sampling cylinder

Statement of Landesanstalt für Umwelt Baden-Württemberg (LUBW) of 28 August 2018

Publication in the German Federal Gazette (BAnz AT 3 May 2021 B9, chapter III, notification 59, announcement by UBA from 31 March 2021):

59 Notification on the announcement of the Federal Environment Agency (UBA) from 17 July 2014 (BAnz AT 5 August 2014 B11, chapter III No. 1.1) and from 27 February 2019 (BAnz AT 26 March 2019 B7, chapter IV, notification 76)

The AMS Gaschromatograph GC 955 version 601 type PID for benzene manufactured by Synspec B.V. was equipped with a new software:

V 6.3.2.0

In addition, the AMS can also be equipped with the following new hardware:

- New Touchpanel LCD
- New operating system Windows 10

Statement of Landesanstalt für Umwelt Baden-Württemberg (LUBW) of 28 August 2020

Publication in the German Federal Gazette (BAnz AT 11 April 2022 B10, chapter VI, notification 1, announcement by UBA from 09 March 2022):

1 Notification on the announcement of the Federal Environment Agency (UBA) from 17 July 2014 (BAnz AT 5 August 2014 B11, chapter III No. 1.1) and from 31 March 2021 (BAnz AT 3 May 2021 B9, chapter III, notification 59)

The AMS Gaschromatograph GC 955 version 601 type PID for benzene manufactured by Synspec B.V. was equipped with a new software:

V 6.3.2.24

In addition, the AMS can also be equipped with the following new hardware:

- Transformer from ACE Wickeltechnik for heating the enrichment column

Statement of Landesanstalt für Umwelt Baden-Württemberg (LUBW) of 22 November 2021

Publication in the German Federal Gazette (BAnz AT 20 March 2023 B6, chapter IV, notification 90, announcement by UBA from 21 February 2023):

90 Notification on the announcement of the Federal Environment Agency (UBA) from 17 July 2014 (BAnz AT 5 August 2014 B11, chapter III No. 1.1) and from 9 March 2022 (BAnz AT 11 April 2022 B10, chapter VI, notification 1)

The AMS Gaschromatograph GC 955 version 601 type PID for benzene manufactured by Synspec B.V. was equipped with a new software:

V 6.4.2.18

In addition, the AMS can also be equipped with the following new hardware:

- Switching power supply Skynet C157 150 W
- Operation of the sample cylinder board with only one driver chip DRV8711 instead of two driver chips as before

Statement of Landesanstalt für Umwelt Baden-Württemberg (LUBW) of 22 August 2022

Publication in the German Federal Gazette (BAnz AT 10 May 2024 B7, chapter V, notification 67, announcement by UBA from 19 March 2024):

67 Notification on the announcement of the Federal Environment Agency (UBA) from 17 July 2014 (BAnz AT 5 August 2014 B11, chapter III No. 1.1) and from 21 February 2023 (BAnz AT 20 March 2023 B6, chapter IV, notification 90)

The AMS Gaschromatograph GC 955 version 601 type PID for benzene manufactured by Synspec B.V. was equipped with a new software:

V 6.4.6.1

In addition, the AMS can also be equipped with the following new hardware:

- Mainboard AS Rock SBC-210 for the internal PC

Statement of Landesanstalt für Umwelt Baden-Württemberg (LUBW) of 31 August 2023

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

Product No.:	9601-PX2XXC
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 ₂ 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
Pre-concentration 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 or 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, Profi-bus or Mod-Bus

Others:

Current software version:	6.4.6.1
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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 Baden-Württemberg is to be informed at the given address on page 1.

This document remains property of the Landesanstalt für Umwelt 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 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.gal1.de.

The certification of the AMS Gaschromatograph GC 955 version 601 (type PID) is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Basic approval:

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

Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg; Karlsruhe

Publication: BAnz AT 5 August 2014 B11, chapter III, No. 1.1,

Announcement by UBA from 17 July 2014

Initial certification according to EN 15267:

Certificate No. LUBW001430001_01: 19 September 2014

Expiry date of the certificate: 4 August 2019

Notifications according to EN 15267:

- Statement of Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg from 23 October 2015
Publication: BAnz AT 14 March 2016 B7, chapter V, notification 1,
Announcement by UBA from 18 February 2016
(Software Update; Change of hardware [board, hard disk]; New operating system)

- Statement of Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg from 15 September 2016
Publication: BAnz AT 15 March 2017 B6, chapter V, notification 11,
Announcement by UBA from 22 February 2017
(Software Update; Change of hardware [Mass-Flow-Controller, hard disk])
- Statement of Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg from 13 September 2017 and
Addendum to the test report 143-04/13 from 11 June 2014 of Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg from 13 September 2017
Publication: BAnz AT 26 March 2018 B8, chapter V, notification 3,
Announcement by UBA from 21 February 2018
(Software Update)

New Certificate:

Certificate No. LUBW001430001_02: 23 April 2018
Expiry date of the certificate: 4 August 2019

- Statement of Landesanstalt für Umwelt Baden-Württemberg from 28 August 2018
Publication: BAnz AT 26 March 2019 B7, chapter IV, notification 76,
Announcement by UBA from 27 February 2019
(Software Update; Change of hardware [New PCB])

New Certificate:

Certificate No. LUBW001430001_03: 20 May 2019
Expiry date of the certificate: 4 August 2024

Notifications according to EN 15267:

- Statement of Landesanstalt für Umwelt Baden-Württemberg from 28 August 2020
Publication: BAnz AT 3 May 2021 B9, chapter III, notification 59,
Announcement by UBA from 31 March 2021
(Software Update; Change of hardware [Touchpanel]; New operating system)
- Statement of Landesanstalt für Umwelt Baden-Württemberg from 22 November 2021
Publication: BAnz AT 11 April 2022 B10, chapter VI, notification 1,
Announcement by UBA from 9 March 2022
(Software Update; Change of hardware [Transformer])

- Statement of Landesanstalt für Umwelt Baden-Württemberg from 22 August 2022
Publication: BAnz AT 20 March 2023 B6, chapter IV, notification 90,
Announcement by UBA from 21 February 2023
(Software Update; Change of hardware [Switching power supply, driver chip])
- Statement of Landesanstalt für Umwelt Baden-Württemberg from 31 August 2023
Publication: BAnz AT 10 May 2024 B7, chapter V, notification 67,
Announcement by UBA from 19 March 2024
(Software Update; Change of hardware [Mainboard PC])

New Certificate:

Certificate No. LUBW001430001_04: 6 November 2024

Expiry date of the certificate: 4 August 2029

Results of the laboratory and field tests and the measurement uncertainties according to EN 14662-3
Synspec GC955-601 (PID – GC 2770)

Parameter	Minimum requirement	value	Given benzene- conc. C _i	sensitivity coefficient	X _{min}	X _{max}	u	u ²
Repeatability standard deviation at c _i	≤ 0,25 µg/m ³	0,05 µg/m ³	5,2 µg/m ³				0,02 µg/m ³	0,0002 (µg/m ³) ²
Largest deviation of linearity	≤ 5,0 %	1,74 %	2,4 µg/m ³				0,05 µg/m ³	0,003 (µg/m ³) ²
Change of the sample gas pressure	≤ 0,1 (µg/m ³)/kPa	0,09 (µg/m ³)/kPa	37,4 µg/m ³	0,09 (µg/m ³)/kPa	81 kPa	110 kPa	0,19 µg/m ³	0,04 (µg/m ³) ²
Change of the surrounding temperature	≤ 0,08 (µg/m ³)/K	0,07 (µg/m ³)/kPa	36,0 µg/m ³	0,07 (µg/m ³)/kPa	273 K	303 K	0,16 µg/m ³	0,03 (µg/m ³) ²
Change of the electrical voltage	≤ 0,08 (µg/m ³)/V	0,006 (µg/m ³)/V	37,4 µg/m ³	0,006 (µg/m ³)/V	207 V	253 V	0,021 µg/m ³	0,0004 (µg/m ³) ²
Interfering component H ₂ O (19 · 10 ³ ppm)	≤ 0,015 (µg/m ³)/10 ³ ppm	-0,014 (µg/m ³)/10 ³ ppm	5,5 µg/m ³	-0,014 (µg/m ³)/10 ³ ppm	0,6 Vol-%	2,1 Vol-%	-0,18 µg/m ³	0,03 (µg/m ³) ²
Carry over (memory-effect)	≤ 1,0 µg/m ³	0,8 µg/m ³	47,2 µg/m ³				0,05 µg/m ³	0,002 (µg/m ³) ²
Reproducibility standard deviation under field conditions	≤ 0,25 µg/m ³	0,10 µg/m ³					0,10 µg/m ³	0,01 (µg/m ³) ²
Long term drift at span-value	≤ 10,0 %	-7,7 %	37,3 µg/m ³				-0,22 µg/m ³	0,05 (µg/m ³) ²
Short term drift at span-value	≤ 2,0 µg/m ³	-0,9 µg/m ³	37,5 µg/m ³					
Difference sample/calibration port*	≤ 1,0 %	k. A %						
Maintenance interval	≤ 14 Tage	4 Wochen						
Availability	≥ 90 %	99,95 %						
test gas	k. A	3,0 %					0,08 µg/m ³	0,01 (µg/m ³) ²

Benzene annual limit value	5,0	µg/m ³
Combined standard uncertainty laboratory	0,32	ppb
Relative expanded uncertainty laboratory	13,0	%
Comb. standard uncertainty laboratory + field	0,41	ppb
Rel. expanded uncertainty laboratory + field	16,3	%

*no separate calibration port

X_{min} Minimum value of the influence quantities

X_{max} Maximum value of the influence quantities

Results of the laboratory and field tests and the measurement uncertainties according to EN 14662-3
Synspec GC955-601 (PID – GC 2771)

Parameter	Minimum requirement	Value	Given benzene- conc. C_t	Sensitivity coefficient	X_{\min}	X_{\max}	u	u^2
Repeatability standard deviation	$\leq 0,25 \mu\text{g}/\text{m}^3$	0,04 $\mu\text{g}/\text{m}^3$	5,2 $\mu\text{g}/\text{m}^3$				0,01 $\mu\text{g}/\text{m}^3$	0,00014 $(\mu\text{g}/\text{m}^3)^2$
Largest deviation of linearity	$\leq 5,0 \%$	4,16 %	2,4 $\mu\text{g}/\text{m}^3$				0,12 $\mu\text{g}/\text{m}^3$	0,014 $(\mu\text{g}/\text{m}^3)^2$
Change of the sample gas pressure	$\leq 0,1 (\mu\text{g}/\text{m}^3)/\text{kPa}$	0,06 $(\mu\text{g}/\text{m}^3)/\text{kPa}$	37,4 $\mu\text{g}/\text{m}^3$	0,06 $(\mu\text{g}/\text{m}^3)/\text{kPa}$	81 kPa	110 kPa	0,13 $\mu\text{g}/\text{m}^3$	0,018 $(\mu\text{g}/\text{m}^3)^2$
Change of the surrounding temperature	$\leq 0,08 (\mu\text{g}/\text{m}^3)/\text{K}$	0,01 $(\mu\text{g}/\text{m}^3)/\text{K}$	36,0 $\mu\text{g}/\text{m}^3$	0,01 $(\mu\text{g}/\text{m}^3)/\text{K}$	273 K	303 K	0,04 $\mu\text{g}/\text{m}^3$	0,00 $(\mu\text{g}/\text{m}^3)^2$
Change of the electrical voltage	$\leq 0,08 (\mu\text{g}/\text{m}^3)/\text{V}$	0,000 $(\mu\text{g}/\text{m}^3)/\text{V}$	37,4 $\mu\text{g}/\text{m}^3$	0,00 $(\mu\text{g}/\text{m}^3)/\text{V}$	207 V	253 V	0,002 $\mu\text{g}/\text{m}^3$	0,0000 $(\mu\text{g}/\text{m}^3)^2$
Interfering component H_2O (19 mmol/mol)	$\leq 0,015 (\mu\text{g}/\text{m}^3)/(\text{mmol}/\text{mol})$	-0,010 $(\mu\text{g}/\text{m}^3)/(\text{mmol}/\text{mol})$	5,5 $\mu\text{g}/\text{m}^3$	-0,0098 $(\mu\text{g}/\text{m}^3)/(\text{mmol}/\text{mol})$	0,6 Vol-%	2,1 Vol-%	-0,126 $\mu\text{g}/\text{m}^3$	0,01600 $(\mu\text{g}/\text{m}^3)^2$
Carry over (memory-effect)	$\leq 1,0 \mu\text{g}/\text{m}^3$	0,95 $\mu\text{g}/\text{m}^3$	47,2 $\mu\text{g}/\text{m}^3$				0,06 $\mu\text{g}/\text{m}^3$	0,003 $(\mu\text{g}/\text{m}^3)^2$
Reproducibility standard deviation under field conditions	$\leq 0,25 \mu\text{g}/\text{m}^3$	0,10 $\mu\text{g}/\text{m}^3$					0,10 $\mu\text{g}/\text{m}^3$	0,01 $(\mu\text{g}/\text{m}^3)^2$
Long term drift at span-value	$\leq 10,0 \%$	-8,8 %	37,3 $\mu\text{g}/\text{m}^3$				-0,25 $\mu\text{g}/\text{m}^3$	0,064 $(\mu\text{g}/\text{m}^3)^2$
Short term drift at span-value	$\leq 2,0 \mu\text{g}/\text{m}^3$	-1,25 $\mu\text{g}/\text{m}^3$	37,5 $\mu\text{g}/\text{m}^3$					
Difference sample/calibration port*	$\leq 1,0 \%$	k. A. %					$\mu\text{g}/\text{m}^3$	$(\mu\text{g}/\text{m}^3)^2$
Maintenance interval	14 Tage	4 Monate						
Availability	$\geq 90 \%$	99,99 %						
test gas	k. A.	3,0 %					0,08 $\mu\text{g}/\text{m}^3$	0,006 $(\mu\text{g}/\text{m}^3)^2$

Benzene annual limit value	5,0	$\mu\text{g}/\text{m}^3$
Combined standard uncertainty laboratory	0,24	ppb
Relative expanded uncertainty laboratory	9,7	%
Comb. standard uncertainty laboratory + field	0,37	ppb
Rel. expanded uncertainty laboratory + field	14,6	%

*no separate calibration port

X_{\min} Minimum value of the influence quantities

X_{\max} Maximum value of the influence quantities