



Certificate number: 3482601-ts



Industrie Service

CERTIFICATE

of product conformity (QAL 1)

Certificate number: 3482601-ts

Certified AMS qSYS for NH₃, H₂O and O₂

Manufacturer SW Technology sagl
Via Penate 16
6850 Mendrisio
Switzerland

Test institute TÜV SÜD Industrie Service GmbH

**This is to certify that the AMS has been tested and found to comply with the standards
DIN EN 15267-1 (2009), DIN EN 15267-2 (2009), DIN EN 15267-3 (2008) and
DIN EN 14181 (2015).**

**Certification applies to the conditions listed in this certificate
(the certificate consists of 10 pages).**

The present certificate replaces certificate 2333401-ts
of 06 September 2017



Certificate No.: 3482601-ts

**Publication in the German Federal Gazette
(BAnz) of 31 July 2017**

**This certificate will expire on:
30 July 2027**

Umweltbundesamt
Dessau, 31 July 2022

TÜV SÜD Industrie Service GmbH
Testing laboratory emission measurement/
calibration
Munich, 30 July 2022

Dr. Marcel Langner
Head of Section II 4.1

Hans-Jörg Eisenberger

Test report	2333401 of 10 October 2016
Initial certification	31 July 2017
Certification validity until	30 July 2027 (5 years)
Certificate	Renewal (previous certificate 2333401-ts of 06 September 2017 valid until 30 July 2022)
Publication	BAnz AT 31.07.2017 B12, chapter I number 2.2

Approved application

The tested AMS is suitable for use at plants requiring authorisation and plants in accordance with the 44. BImSchV for monitoring the component NH₃ for measuring the accompanying H₂O and O₂. The suitability for this application was assessed on the basis of a laboratory test and a field test lasting over more than three months at plant according to Directive 2010/75/EU chapter IV (17. BImSchV). The measuring system is approved for ambient temperatures between +5 °C bis +40 °C

The AMS publication, the suitability test and the performance of the uncertainty calculations were conducted based on the provisions valid at the time of testing. Due to possible amendments to legal foundations, every user should ensure before use of the AMS that it is suitable for monitoring the applicable values.

The operator should consult the manufacturer to ensure that the AMS is suitable for the plant at which it is to be installed.

Certification basis

This certificate is based on:

- TÜV SÜD Industrie Service GmbH test report 2333401 from 10 October 2016
- Suitability announcement by the German Federal Environmental Agency as relevant body
- The ongoing surveillance of the product and the manufacturing process

- Publication in the German Federal Gazette (BAnz AT 31 July 2017 B12, chapter I, no. 2.2, UBA publication from 13 July 2017)

AMS:	qSYS for NH ₃ , O ₂ and humidity		
Manufacturer:	SW Technology sagl, Mendrisio/Switzerland		
Suitability:	For plants requiring authorisation and plants in compliance with the 44. BImSchV		
Measurement ranges in the suitability test:			
Component	Certification range	Supplementary measurement range	Unit
NH ₃	0 - 10	0 - 50	mg/m ³
H ₂ O	0 - 30	-	Vol.-%
O ₂	0 - 25	-	Vol.-%
Software-versions:			
	qLDX: Softwareapplikation v1.0.3.1 System Firmware: 1.0.5.0		
	qOXY: Softwareapplikation v1.0.3.0 System Firmware: 1.0.5.0		
Restrictions:			
The AMS cannot be used in waste incineration plants where there is no proof of a connection between O ₂ and CO ₂ content.			
Notes:			
1. The maintenance interval is four weeks.			
2. The AMS should be operated at an interval of 24 hours for automatic alignment. The zero points for components NH ₃ and H ₂ O and the reference point for O ₂ shall be realigned with prepared ambient air.			
3. The AMS determines the gas concentrations for NH ₃ in moist measurement gas and for O ₂ in dry measurement gas.			
4. For cross-sensitivity compensation, the AMS requires the CO ₂ concentration. In the case of operation of the AMS at waste incineration plants, the CO ₂ maximum value shall be entered in the menu for cross-sensitivity compensation, the CO ₂ concentration should be calculated taking into account the measured oxygen concentration.			
5. In the case of waste incineration plants with non-defined carbon content, the CO ₂ maximum value shall be determined by measuring the CO ₂ and O ₂ concentrations in flue gas. A representative operating mode should be observed in the waste incineration plant.			
Test report:	TÜV SÜD Industrie Service GmbH, Munich Report no.: 2333401 from 10 October 2016		

Certified Product

The certificate applies to AMS that comply with the following description:

The qSYS AMS is a multi-component gas analysis system for measuring NH₃, H₂O and O₂. The AMS consists of the following main components:

- Sample probe with PTFE filter
- Heating pipe, internal diameter 4 mm, material Teflon
- System cabinet with the following components:
 - qLDX analysis module for NH₃/ H₂O
 - qOXY analysis module for O₂
 - Panel-PC (only for visualisation) (optional)
 - Measurement gas cooler
 - Heating box with measurement gas pump
 - Air conditioner for the control cabinet
 - Heating for the control cabinet
 - Circulation fans
 - PLC control
 - 2 digital flow indicators with limit monitors
 - 3 temperature regulators (2 x measurement gas pipe, heating box)

Sample gas extraction consists of a stainless steel extraction probe, with a PTFE-filter heated to 185 °C. A sample gas pipe heated to 185 °C is attached to the probe, fitted with a PTFE-seal (interior diameter 4 mm). After the heated pipe, the sample gas flows into the heated gas distributor box with measurement gas pump. The engine for the measurement gas pump is flange-mounted outside the heating box. The connection for hot air, the test gas connection and a throttle for volume restriction as well as a measurement gas filter (PTFE) are also in the heating box. The measurement gas is fed from this heated box into the qLDX heat measuring analyser via a short heated line to measure NH₃ and H₂O. The measurement gas flowing from the qLDX analyser via an unheated PTFE line is fed into the first cool level of a two-tier measurement gas cooler to measure the component O₂. Between the first and second cooler level there is a flow indicator with alarm contact for the entire measurement gas flow and a bypass with throttle valve to set the measurement gas flow on the qOXY O₂ analyser. The measurement gas partial flow for oxygen measurement is applied via the second cooler level, which is also downstream of a flow indicator with alarm contact, via a moisture sensor and a fine filter to the qOXY analyser. The measurement unit is installed in a system cabinet with fitted air-conditioning device. To measure NH₃ and H₂O the qLDX analyser works according to the TDLS (Tunable-Diode-Laser-Spectroscopy) principle. The component O₂ is determined in the qOXY analyser using a zirconium dioxide cell. With the exception of the sample gas extraction probe, the heated line and the heated distributor box all system components are in the air-conditioned measurement cabinet.

The AMS consists of the following components:

Probe

Manufacturer: JCT – Analysentechnik GmbH, Wiener Neustadt, Austria
 Type: JES 301 35.00, heated to 185 °C
 Filter: JCT Kit 35.9013 PTFE-filter 2 µm
 Regulator: integrated

Heated sampling hose

Manufacturer: RACO SaS, Novate Milanese, Italy
 Type: Standard, 100 W/m DN4/6
 Heated temperatures: 185 °C
 Length: 30 m (PTFE-hose), 7 m in the lab test
 Diameter: 6 mm AD / 4 mm ID
 Regulator: KM Controller, Fa. Ascon Tecnologico S.r.l., Italy

Heated sampling hose to the heated box - qLDX

Manufacturer: RACO SaS, Novate Milanese, Italy
 Type: Standard, 100 W/m DN4/6
 Heated temperatures: 185 °C
 Length: 1.5 m (PTFE-hose)
 Diameter: 6 mm AD / 4 mm ID
 Regulator: KM Controller, Fa. Ascon Tecnologico S.r.l., Italy

Compressor cooler

Manufacturer: JCT – Analysentechnik GmbH, Wiener Neustadt, Austria
 Type: JCT 2 Midi

Measurement gas pump

Manufacturer: heated pump head in heated box
 KNF
 Type: N 86 AT.16E

Solenoid valves

Manufacturer: Bürkert GmbH & Co. KG
 Type: 0124

Sample gas filter in heated box

Manufacturer: Headline Filters Ltd., England
 Type: 122 / PTFE-Filter 2 µm

Analyser module

Manufacturer: NH₃, H₂O
 SW Technology sagl, Mendrisio, Switzerland
 Type: qLDX
 Software: v1.0.3.1 firmware: 1.0.5.0

Analyser module

Manufacturer: O₂
 SW Technology sagl, Mendrisio, Switzerland
 Type: qOXY
 Software: v1.0.3.0 firmware: 1.0.5.0



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Flow indicator	digital with limit indicator 2x
Manufacturer:	SMC
Type:	PFM 7
Sample gas filter	downstream of the sample gas cooler - qOxy
Manufacturer:	GMF
Type:	751NC / filter 25-64-60K
Air conditioner	
Manufacturer:	Cosmotec, Stulz S.P.A., Valeggio, Italy
Model:	wall mounting - cooler
Type:	CVE – CVO
Electrical power:	1500 W/230VAC
Circulation fan	
Manufacturer:	ebm papst
Type:	D2E 146-HT67
Electrical power:	355 W / 50 Hz
Cabinet heater	
Manufacturer:	Alfa Elektrik
Type:	SHT 750
Electrical power:	750 W
Programmable logic controller (PLC)	
Manufacturer:	Siemens
Type:	S71200
Software:	TIA Portal V13
Panel-PC (option)	
Operating system:	Windows 7 Pro / 8 / 10
CPU:	32 / 64 bit

General notes

This certificate is based on the analyser tested. The manufacturer is responsible for the continuous compliance of the production to the DIN EN 15267 requirements. The manufacturer is obliged to maintain a tested quality management system to control the manufacture of the certified product. Regular monitoring must be conducted on both the product and the quality management systems.

Should the product from the current production series no longer comply with the certified product, the Environmental Service Department of TÜV SÜD Industrie Service GmbH should be informed (address see footnote).

The certification mark, which appears on the certified product or is used in advertising materials, is presented on page 1 of this certificate.

This document and the certification mark shall remain the property of TÜV SÜD Industrie Service GmbH.

Should the publication be revoked, this certificate will become invalid. This document must be returned when the period of validity has elapsed and at the request of TÜV SÜD Industrie Service GmbH and the certification mark may no longer be used.

The current version of the certificate and its validity can also be viewed on the internet page: **qa11.de**.

The certification of the measuring system qSYS is based on the following documents and the regular continuous monitoring of the manufacturer's quality management system:

Initial certification in accordance to DIN EN 15267

Certificate no. 2333401-ts	06 September 2017
Certificate validity until	30 July 2022 (5 years)

Report no: 2333401 from 10 October 2016,
TÜV SÜD Industrie Service GmbH
Publication: BAnz AT 31 July 2017 B12, chapter I number 2.2
UBA publication from 13 July 2017

Renewal of the certificate

Certificate no. 3482601-ts	31 July 2022
Expiry date of the certificate	30 July 2027 (5 years)

Calculation of total uncertainty for QAL1 testing to DIN EN 14181 and DIN EN 15267-3

Total uncertainty for the measurement component NH₃ in the measuring range 0-10 mg/m³

<i>Performance characteristic</i>	<i>Uncertainty</i>	<i>Value standard uncertainty mg/m³</i>	<i>Square of standard uncertainty (mg/m³)²</i>
Lack-of-fit	u_{lof}	0,053	0,003
Zero drift from field test	u_{dz}	0,083	0,007
Span drift from field test	u_{ds}	0,150	0,023
Influence of ambient temperature at span	u_t	0,131	0,017
Influence of sample gas pressure	u_p		
Influence of sample gas flow	u_f	0,089	0,008
Influence of supply voltage	u_v	0,049	0,002
Cross-sensitivity (interference)	u_i	-0,213	0,045
Repeatability standard deviation at span	$u_r = s_r$	0,062	$u_r < u_d$
Standard deviation from paired measurements under field cond.	$u_d = s_d$	0,132	0,017
Uncertainty of reference material 2 % by 70% of ZR	u_{rm}	0,081	0,007
Excursion of measurement beam	u_{mb}		
Converter efficiency for AMS measuring NOx	u_{ce}		
Variation of response factors (TOC)	u_{rf}		
		total	0,129
Combined standard uncertainty	$u_c = \sqrt{\sum (u_i)^2}$	0,359	mg/m ³
Total expanded uncertainty	$U_{0,95} = 1,96 \times u_c$	0,704	mg/m ³
Relativ expanded uncertainty	U	10,5	% ELV
Permissible uncertainty of EN 15267-3	(of ELV 6,7 mg/m ³)	30	% ELV
Complied with requirements relating to the measurement uncertainty		yes	regarding EN 15267-3
Permissible uncertainty 13. / 17. BImSchV	(of ELV 6,7 mg/m ³)	40	% ELV
Complied with requirements relating to the measurement uncertainty		yes	regarding 13. / 17. BImSchV

Total uncertainty for the measurement component H₂O in the measuring range 0-30 Vol.-%

<i>Performance characteristic</i>	<i>Uncertainty</i>	<i>Value standard uncertainty Vol.%</i>	<i>Square of standard uncertainty (Vol.%)²</i>
Lack-of-fit	u_{lof}	0,128	0,016
Zero drift from field test	$u_{d,z}$	0,087	0,008
Span drift from field test	$u_{d,s}$	0,502	0,252
Influence of ambient temperature at span	u_t	0,426	0,181
Influence of sample gas pressure	u_p		
Influence of sample gas flow	u_f	-0,129	0,017
Influence of supply voltage	u_v	0,081	0,007
Cross-sensitivity (interference)	u_i	-0,456	0,208
Repeatability standard deviation at span	$u_r = s_r$	0,064	$u_r < u_d$
Standard deviation from paired measurements under field cond.	$u_d = s_d$	0,243	0,059
Uncertainty of reference material 2 % by 70% of ZR	u_{rm}	0,243	0,059
Excursion of measurement beam	u_{mb}		
Converter efficiency for AMS measuring NOx	u_{ce}		
Variation of response factors (TOC)	u_{rf}		
		total	0,807
Combined standard uncertainty	$u_c = \sqrt{\sum (u_i)^2}$	0,898	Vol.%
Total expanded uncertainty	$U_{0,95} = 1,96 \times u_c$	1,761	Vol.%
Relativ expanded uncertainty	U	5,9	% CR
Permissible uncertainty of EN 15267-3	(of CR 30 Vol.%)	7,5	% CR
Complied with requirements relating to the measurement uncertainty		yes	regarding EN 15267-3
Permissible uncertainty 13. / 17. BImSchV	(of CR 30 Vol.%)	10	% CR
Complied with requirements relating to the measurement uncertainty		yes	regarding 13. / 17. BImSchV

Total uncertainty for the measurement component O₂ in the measuring range 0-25 Vol.-%

<i>Performance characteristic</i>	<i>Uncertainty</i>	<i>Value standard uncertainty Vol.%</i>	<i>Square of standard uncertainty (Vol.%)²</i>
Lack-of-fit	u_{lof}	-0,046	0,002
Zero drift from field test	$u_{d,z}$	0,035	0,001
Span drift from field test	$u_{d,s}$	-0,110	0,012
Influence of ambient temperature at span	u_t	0,01	0,0000
Influence of sample gas pressure	u_p		
Influence of sample gas flow	u_f	-0,009	0
Influence of supply voltage	u_v	0,028	0,00100
Cross-sensitivity (interference)	u_i	0,036	0,001
Repeatability standard deviation at span	$u_r = s_r$	0,010	$u_r < u_d$
Standard deviation from paired measurements under field cond.	$u_d = s_d$	0,033	0,001
Uncertainty of reference material 1 % by 70% of ZR	u_{rm}	0,101	0,01
Excursion of measurement beam	u_{mb}		
Converter efficiency for AMS measuring NOx	u_{ce}		
Variation of response factors (TOC)	u_{rf}		
		total	0,028
Combined standard uncertainty	$u_c = \sqrt{\sum (u_i)^2}$	0,167	Vol.%
Total expanded uncertainty	$U_{0,95} = 1,96 \times u_c$	0,327	Vol.%
Relativ expanded uncertainty	U	1,3	% CR
Permissible uncertainty of EN 15267-3	(of CR 25 Vol.%)	7,5	% CR
Complied with requirements relating to the measurement uncertainty		yes	regarding EN 15267-3
Permissible uncertainty 13. / 17. BImSchV	(of CR 25 Vol.%)	10	% CR
Complied with requirements relating to the measurement uncertainty		yes	regarding 13. / 17. BImSchV