

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000056508_01

AMS designation: LDS 6 7MB6121 with CD 6 7MB6122 sensor for NH₃ and H₂O

Manufacturer: Siemens AG
Östliche Rheinbrückenstraße 50
76187 Karlsruhe
Germany

Test Laboratory: TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and certified
according to the standards

EN 15267-1: 2009, EN 15267-2: 2009, EN 15267-3: 2007
and EN 14181: 2004

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 9 pages).

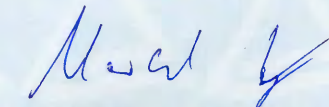


Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000056508

Publication in the German Federal Gazette
(BAnz) of 05 March 2013

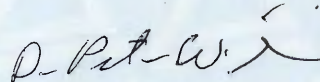
German Federal Environment Agency
Dessau, 05 March 2018



Dr. Marcel Langner
Head of Section II 4.1

This certificate will expire on:
04 March 2023

TÜV Rheinland Energy GmbH
Cologne, 04 March 2018



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Test institute accredited to EN ISO/IEC 17025:2005 by DAkkS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00.

Test Report:	1701628.10 dated 09 October 2012
Initial certification:	05 March 2013
Expiry date:	04 March 2023
Certificate:	Renewal (of previous certificate 1701628.10 dated 5 March 2013 valid until 04 March 2018)
Publication:	BAnz AT 05.03.2013 B10, chapter I number 5.6

Approved application

The tested AMS is suitable for use at combustion plants according to EC Directive 2001/80/EC (13th BImSchV), at waste incineration plants according to EC Directive 2000/76/EC (17th BImSchV), the 27th BImSchV and TA Luft. The measured ranges have been selected so as to cater for as broad a field of application as possible.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a field test of more than three months at a waste incineration plant.

The central unit of the AMS is approved for an ambient temperature range of +5 °C to +40 °C and the sensor unit is approved for a temperature range of -20 °C to +50 °C.

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

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

Basis of the certification

This certification is based on:

- Test report 1701628.10 dated 09 October 2012 issued by TÜV SÜD Industrie Service GmbH
- Suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process

Publication in the German Federal Gazette: BAnz AT 05.03.2013 B10, chapter I number 5.6, UBA announcement dated 12 February 2013:

AMS designation:

Central unit LDS 6 7MB6121 for NH₃/H₂O, Sensor 7MB6122

Manufacturer:

Siemens AG, Karlsruhe

Field of application:

For plants requiring official approval and for plants according to the 27th BImSchV

Measuring ranges during performance testing:

Component	Certification range	Supplementary measuring ranges		Unit
NH ₃	0–20	0–76	0–380	mg/m ³
H ₂ O	0–30	0–40	-	Vol.-%

At a measurement path of 1.25 m, these measuring ranges correspond to the following products of measured component concentrations and optical path lengths:

Component	Certification range	Supplementary measuring ranges		Unit
NH ₃	0–25	0–95	0–475	mg/m ³ x m
H ₂ O	0–37.5	0–50.0	-	Vol.-% x m

Software version:

R25

Restriction:

The degree of protection for the central unit is merely IP20. Where the intended application requires a higher degree of protection, the central unit will have to be integrated into a measurement rack which provides an adequate degree of protection.

Notes:

- For the single-component versions LDS 6 NH₃ and LDS 6 H₂O, minimum requirements are also satisfied. The performance tested version of the instrument is available under the following AMS designation:

AMS designation:	measuring range
7 MB 6121 – 0DT	0–20 mg/m ³ NH ₃ 0–76/0–380 mg/m ³ NH ₃ 0–30/0–40 Vol.-% H ₂ O
7 MB 6121 – 0CT	0–20 mg/m ³ NH ₃ 0–76/0–380 mg/m ³ NH ₃
7 MB 6121 – 0MT	0–30/0–40 Vol.-% H ₂ O
7 MB 6122 – 0W sensor unit	

2. Parameters to compensate for cross-sensitivities of NH₃ measurements with O₂ and CO₂ will have to be adjusted appropriately for the instrument.
3. When using the RC 3009 calibration kit, the dynamic moisture compensation will have to be deactivated.
4. The analyser has to be operated with an air purging unit.
5. Information on sample gas pressure and temperature will have to be provided to the instrument. Information can be provided as a 4–20 mA analogue signal or, if conditions are fairly stable, as a fixed parameter.
6. The maintenance interval is two weeks.
7. Zero and span point drift for NH₃ and H₂O should be checked every 9 months using an alignment apparatus.
8. The alarm threshold for relative transmission, when interference is reported due to contamination or re-alignment of the sensor heads, should be set at least at 85% (transmission disturbance can indicate re-adjustment).
9. Supplementary testing (migration to standard EN 15267, supplementary measuring ranges) as regards Federal Environment Agency (UBA) notices of 3 August 2009 (BAnz p. 2929, chapter I number 3.6) and of 6 July 2012 (BAnz AT 20.07.2012 B11, chapter IV notification 29).

Test Report:

TÜV Süd Industrie Service GmbH, Munich
Report no.: 1701628.10 dated 09 October 2012

Publication in the German Federal Gazette: BAnz AT 01.08.2016 B11, chapter V notification 25,
UBA announcement dated 14 July 2016:

25 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 5.6)

The current software version of the LDS 6 7MB6121/6122 for NH₃/H₂O measuring system manufactured by Siemens AG is R25 2.10.06. Version R25 2.10.06 includes version R25 2.10.05, which is also approved.

Statement issued by TÜV Süd Industrie Service GmbH dated 26 February 2016

Certified product

This certification applies to automated measurement systems conforming to the following description:

The entire tested AMS consists of the central unit 7MB6121, the sensor pair CD 6 7MB6122, the hybrid cable, sensor connecting cable, optical alignment system and reference kit (RC 3009). The AMS operates based on the principle of high-resolution molecular absorption spectroscopy as in-situ measurement of NH₃ and H₂O.

A diode laser produces laser light in the near infrared range, which passes through the measurement gas and is received by the detector. The wavelength of the laser light is aligned to a specific absorption line of the gas to be measured. The laser continually scans this single absorption line with a very high spectral resolution. The result is a completely resolved single molecule line, which is analysed for absorption intensity and line form. The stability of the spectrometer is continuously monitored by an internal reference and zero gas path and an alignment of zero and span point is generally unnecessary.

The sensor unit is fitted with an external air purging system to protect the optical surfaces.

The central unit can process a maximum of three measurement gas channels.

The reference kit (RC 3009) for NH₃ and H₂O can be used for external monitoring of zero and span points.

The entire system is made up of the following components:

Central unit	LDS 6 7MB6121
Sensor unit	CD 6 7MB6122
Hybrid cable	Length up to 700 m (Connection central unit to CD 6 sensor transmitter)
Sensor connecting cable	(Connection central unit to CD 6 sensor transmitter to the CD 6 sensor receiver)
Accessories	Optical alignment system Reference kit

The current software version is: R25 2.10.06

The current manual version is: A5E00295893 Version 05/2009

General remarks

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 manufacturing process for 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 Energy GmbH must be notified at the address given 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 document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. Upon revocation of the publication the certificate loses its validity. After the expiration of the certificate and on request of TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must no longer be used.

The relevant version of this certificate and its expiration date are also accessible on the internet at qal1.de.

Certification of the LDS 6 7MB6121 with CD 6 7MB6122 sensor is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

Basic testing

Test report 751376 dated 05 January 2006
TÜV SÜD Industrie Service GmbH
Publication: BAnz. 08 April 2006, no. 70, p. 2653, chapter IV no. 3.1
UBA announcement dated 21 February 2006

Supplementary testing

Test report: 819683 dated 29 February 2008
TÜV SÜD Industrie Service GmbH
Publication: BAnz. 03 September 2008, no. 133, p. 3243, chapter I no. 2.6
UBA announcement dated 12 August 2008

Test report: 819683-E2 dated 31 March 2009
TÜV SÜD Industrie Service GmbH
Publication: BAnz. 25 August 2009, no. 125, p. 2929, chapter I no. 3.6
UBA announcement dated 3 August 2009

Notifications

Statement issued by TÜV Süd Industrie Service GmbH dated 31 March 2009
Publication: BAnz. 25 August 2009 no. 125, p. 2929, chapter III notifications 25 and 26
UBA announcement dated 3 August 2009
(new software version and new manufacturer name)

Statement issued by TÜV Süd Industrie Service GmbH dated 26 October 2009
Publication: BAnz. 12 February 2010, no. 24, p. 552, chapter IV notification 22
UBA announcement dated 25 January 2010
(new software version)

Statement issued by TÜV Süd Industrie Service GmbH dated 17 October 2011
Publication: BAnz. 02 March 2012, no. 36, p. 920, chapter IV notification 20
UBA announcement dated 23 February 2012
(distribution assumed by Bühler Technologies GmbH)

Statement issued by TÜV Süd Industrie Service GmbH dated 16 March 2012
Publication: BAnz AT 20.07.2012 B11, chapter IV notification 29
UBA announcement dated 06 July 2012
(new software version)

Initial certification according to EN 15267

Certificate no. 1701628.10-ts: 05 March 2013
Expiry date of the certificate: 04 March 2018

Test report 1701628.10 dated 09 October 2012
TÜV SÜD Industrie Service GmbH
Publication: BAnz AT 05.03.2013 B10, chapter I number 5.6
UBA announcement dated 12 February 2013

Notification in accordance with EN 15267

Statement issued by TÜV Süd Industrie Service GmbH dated 26 February 2016
Publication: BAnz AT 01.08.2016 B11, chapter V notification 25
UBA announcement dated 14 July 2016
(new software version)

Renewal of the certificate

Certificate no. 0000056508_01: 05 March 2018
Expiry date of the certificate: 04 March 2023

Total uncertainty for the measurement component NH₃ in the measurement range 0-20 mg/m³

<i>Performance characteristic</i>	<i>Uncertainty</i>	<i>Value of standard uncertainty in mg/m³</i>	<i>Square sum of standard uncertainty in (mg/m³)²</i>
Lack-of-fit	u_{lof}	0,566	0,320
Zero point drift	$u_{d,z}$	-0,286	0,084
Span point drift	$u_{d,s}$	0,254	0,065
Influence of ambient temperature at span point	u_t	0,300	0,151
Influence of sample gas pressure	u_p	0,119	0,014
Influence of sample gas flow	u_f		
Influence of voltage	u_v	0,152	0,023
Cross-sensitivity	u_i	-0,416	0,173
Standard deviation from paired measurements or repeat standard deviation at span point ^{*)}	u_r	0,323	0,104
Uncertainty of the test gas	u_{tg}	0,162	0,026
Uncertainty on excursion of measurement beam	u_{mb}	-0,231	0,053
Sum		-	1,013
Combined standard uncertainty	$u_c = \sqrt{\sum(u_i)^2}$	1,01	mg/m ³
Expanded uncertainty	$U_{0,95} = 1,96 \times u_c$	1,97	mg/m ³
Relative expanded uncertainty	U	19,7	% ELV
Demanded uncertainty to DIN EN 15237 - 3 (ELV 10 mg/ m ³)		30	% ELV
Requirement concerning uncertainty fulfilled		Yes	

^{*)} here: Standard deviation from paired measurements

Uncertainty calculations were taken from certificate no. 1701628.10-ts prepared by TÜV SÜD Industrie Service GmbH

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

<i>Performance characteristic</i>	<i>Uncertainty</i>	<i>Value of standard uncertainty in Vol.-%</i>	<i>Square sum of standard uncertainty in (Vol.-%)²</i>
Lack-of-fit	M_{lof}	-0,410	0,17
Zero point drift	$M_{d,2}$	0,208	0,04
Span point drift	$M_{d,3}$	0,502	0,25
Influence of ambient temperature at span point	M_t	0,230	0,05
Influence of sample gas pressure	M_p	0,152	0,02
Influence of sample gas flow	M_f		
Influence of voltage	M_v	0,157	0,02
Cross-sensitivity	M_s	0,208	0,04
Standard deviation from paired measurements or repeat standard deviation at span point ^{*)}	u_r	0,193	0,04
Uncertainty of the test gas (2% at 70% CR)	u_{tg}	0,242	0,06
Uncertainty or excursion of measurement beam	u_{mb}	-0,294	0,09
Sum		-	0,790
Combined standard uncertainty	$u_c = \sqrt{\sum (u_i)^2}$	0,90	Vol.-%
Expanded uncertainty	$U_{0,95} = 1,96 \times u_c$	1,74	Vol.-%
Relative Expanded uncertainty	U	8,7	% from the limit value
Demanded uncertainty (ELV 20 Vol.-%)		22,5	% from the limit value
Requirement concerning uncertainty fulfilled		Yes	

^{*)} here: Standard deviation from paired measurements

Uncertainty calculations were taken from certificate no. 1701628.10-ts prepared by TÜV SÜD Industrie Service GmbH