Umwelt Bundes Amt
For our Environment

TÜVRheinland®
Precisely Right.

CERTIFICATE

about Product Conformity (QAL1)

Number of Certificate: 0000025930_01

Certified AMS:	MKAS S800 for CO, NO, NO_2, SO_2, CH_4, N_2O, CO_2 und O_2
Manufacturer:	SICK MAIHAK GmbH Nimburger Straße 11 79276 Reute Deutschland
Test Institute:	TÜV Rheinland Energie und Umwelt GmbH

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

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 (see also the following pages).
The present certificate replaces Certificate No. 0000025930 of 2010-02-12

www.tuv.com TÜVRheinland® ID: 0000025930

- EN 15267-3 tested
- QAL1 certified
- TUV approved
- Annual Inspection

Publication in the German Federal Gazette
BAnz 2010-07-28

The certificate is valid until: 2015-02-11

Umweltbundesamt

Dessau, 2010-08-02

i. A. Dr. Hans-Joachim Hummel

TÜV Rheinland Energie und Umwelt GmbH

Köln, 2010-07-29

i. V. Dr. Peter Wilbring

www.umwelt-tuv.de teu@umwelt-tuv.de Tel. +49 - 221 - 806 - 2275	TÜV Rheinland Energie und Umwelt GmbH Am Grauen Stein 51105 Köln
Accreditation according to EN ISO/IEC 17025:2005 and certification according to EN ISO 9001:2008	

10/221 2.08

Test report:	936/21211670/B of 2010-03-26
First certification:	2010-02-12
Run of validity until:	2010-02-11
Publication	BAnz. 2010-07-28, No. 111, p. 2597

Approved application:
The certified AMS is suitable for use at combustion plants according to EC directive 2001-80-EC, at waste incinerations according to EC directive 2000-76-EC and other plants requiring official permission. The certification ranges have been chosen with respect to the wide application range of the AMS.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a field test on a municipal heat and power plant.

The AMS is approved for the temperature range from +5 °C to +40 °C.

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

Basis of the certification
This certification is based on the test report 936/21211670/B from 2010-03-26 and 936/21211670/A from 2009-10-29 of TÜV Rheinland Immissionsschutz und Energiesysteme GmbH and on the relevant bodies (German Umweltbundesamt) assessment and ongoing surveillance of the product and the manufacturing process and the publication in the German Federal Gazette (BAnz. 2010-07-28, No. 111, p. 2597: UBA publication from 2010-07-12).

AMS name:
Modular system MKAS S800 for CO, NO, NO_2, SO_2, CH_4, N_2O, CO_2 and O_2

Manufacturer:
SICK MAIHAK GmbH, Reute

Application:
For measurements at plants requiring official permission (i. e. 2000-76-EC, waste incineration directive and 2001-80-EC, large combustion plants directive)

Measuring ranges of the suitability test:

Component	Modul	Certification range	Additional ranges		Unit
			Range 1	Range 2	
CO	MKAS S800 - UNOR for CO	0 - 75	0 - 750	0 - 3000	mg/m³
	MKAS S800 - MULTOR for CO	0 - 200	0 - 2000	---	mg/m³
NO	MKAS S800 - UNOR for NO	0 - 100	0 - 1000	0 - 2000	mg/m³
	MKAS S800 - MULTOR for NO	0 - 250	0 - 2500	---	mg/m³
	MKAS S800 - DEFOR for NO	0 - 50	0 - 1000	0 - 2000	mg/m³
NO_2	MKAS S800 - DEFOR for NO_2	0 - 50	0 - 500	---	mg/m³
NOx	MKAS S800 – UNOR with converter for NO_x	0 - 100	0 - 1000	0 - 2000	mg/m³

SO_2	MKAS S800 - UNOR for SO_2	0 - 75	0 - 287	0 - 2000	mg/m³
	MKAS S800 - MULTOR for SO_2	0 - 250	0 - 2000	---	mg/m³
	MKAS S800 - DEFOR for SO_2	0 - 75	0 - 287	0 - 2000	mg/m³
CH_4	MKAS S800 - UNOR for CH_4	0 - 50	0 - 500	---	mg/m³
	MKAS S800 - MULTOR for CH_4*	0 - 286	0 - 500	---	mg/m³
N_2O	MKAS S800 - UNOR for N_2O	0 - 50	0 - 500	---	mg/m³
CO_2	MKAS S800 - UNOR for CO_2	0 - 25	---	---	Vol.-%
	MKAS S800 - MULTOR for CO_2	0 - 25	---	---	Vol.-%
O_2	MKAS S800 - OXOR-P for O_2	0 - 25	---	---	Vol.-%
	MKAS S800 - OXOR-E for O_2	0 - 25	---	---	Vol.-%

* German Technical Instruction on Air Quality Control and combustion plants

Software versions:

T825_090707_1000
PC-Software: Sopas ET 2.20 Build 2766

Restrictions:

1. The correct function of the selected module combination shall be determined within the scope of the check on proper installation.
2. The maintenance interval shall be determined within the scope of the check on proper installation.

Remarks:

1. Automatic calibration of zero point shall be carried out at least once a week for all components besides O_2 (OXOR-P and OXOR-E) by using humidified ambient air. The automatization is possible.
2. Automatic calibration of span point shall be carried out at least once a week for sensors OXOR-P and OXOR-E (O_2) by using humidified ambient air. The automatization is possible.
3. The measuring system fulfils minimum requirement even at an ambient air temperature of 50 °C due to the external climatisation unit.
4. The measuring system may be operated with cooler type MAK10-2 by AGT Thermotechnik as well as with cooler type CSS-V2SK by company M&C.
5. Supplementary testing (extension of additional components, extension of the maintenance interval, suitability of a converter and an alternate cooler type) on the announcement in BAnz. No. 24, p. 553, of 2010-01-25.

Test report:

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln
Report-No.: 936/21211670/B of 2010-03-26

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

The multicomponent measuring system MKAS S800 is a modular sensor system. The base part is the instrument cabinet including the interface modules, measuring gas pump, test gas supply unit, electronic-unit and SCU/BCU control unit. It is possible to place up to three different measurement modules in this instrument cabinet. All gas sensors are able to work independent from other sensors.

Thus, the modular measurement system can be equipped according to different requirements, each with appropriate measurement modules.

The following gas senor modules have been certified so far: UNOR, MULTOR, DEFOR, OXOR.

All gas senor modules are controlled by a BUS-system. The data output and adjustment of all sensors can be observed with this system.

The following components are part of the complete system:

- heated probe (M&C SP 2000) with heated filter, test gas offering function and back-flush function,
- heated gas tube (a heated line with a length of 10 m was used during the laboratory investigations, during field investigations a heated line with a length of 50 m was used),
- instrument cabinet with interface modules, measuring gas pump, test gas supply unit, sensor modules with gas sensors, electronic-unit and SCU/BCU control unit.

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 DIN 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 certified product is found no longer to comply with the applicable European Standard, TÜV Rheinland Energie und Umwelt GmbH should be notified at the address shown on page 1.

The certification mark with the ID-Number that 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 the property of TÜV Rheinland Energie und Umwelt GmbH. With revocation of the publication the certificate looses 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 seen at the Internet Address: **qal1.de**.

Certification of the MKAS S800 for CO, NO, NO_2, SO_2, CH_4, N_2O, CO_2 and O_2 is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Initial certification according to EN 15267:

Certificate No. 0000025930: 2010-02-12

Validity of the certificate: 2015-02-11

Test report: 936/21211670/A of 2009-10-29,
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln,

Publication: BAnz. 2010-02-12, No. 24, p. 553: Announcement by UBA from 2010-01-25.

Supplementary testing according to EN 15267:

Certificate No. 0000025930_01:2010-07-28

Validity of the certificate: 2015-02-11

Test report: 936/21211670/B of 2010-03-26,
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln,

Publication: BAnz. 2010-07-28, No. 111, p. 2597: Announcement by UBA from 2010-07-12.

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 UNOR for CO
Serial Number	TÜV 1 / TÜV 3
Measuring Principle	NDIR
TÜV Data	
Approval Report	936/21211670/A / 2009-10-29
Editor	Schneider
Date	2009-10-29
Measurement Component	CO
Certificated range	75 mg/m³

Evaluation of the cross sensitivity (CS)	
Sum of positive CS at zero point	1.80 mg/m³
Sum of negative CS at zero point	-1.30 mg/m³
Sum of postive CS at reference point	1.07 mg/m³
Sum of negative CS at reference point	0.00 mg/m³
Maximum sum of cross sensitivities	1.80 mg/m³
Uncertainty of cross sensitivity	1.04 mg/m³

Calculation of the combined standard uncertainty

Test Value		u	u²
Standard deviation from paired measurements under field conditions *	u_D	0.747 mg/m³	0.558 (mg/m³)²
Lack of fit	u_{lof}	0.289 mg/m³	0.084 (mg/m³)²
Zero drift from field test	$u_{d,z}$	0.346 mg/m³	0.120 (mg/m³)²
Span drift from field test	$u_{d,s}$	0.866 mg/m³	0.750 (mg/m³)²
Influence of ambient temperature at span	u_t	0.751 mg/m³	0.564 (mg/m³)²
Influence of supply voltage	u_v	0.115 mg/m³	0.013 (mg/m³)²
Cross sensitivity (interference)	u_i	1.039 mg/m³	1.080 (mg/m³)²
Influence of sample gas flow	u_p	-0.029 mg/m³	0.001 (mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.606 mg/m³	0.368 (mg/m³)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	1.88 mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	3.69 mg/m³

Relative total expanded uncertainty	**U in % of the ELV 50 mg/m³**	**7.4**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 50 mg/m³**	**10.0**
Requirement of EN 15267-3	U in % of the ELV 50 mg/m³	7.5

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 MULTOR for CO
Serial Number	TÜV 1 / TÜV 3
Measuring Principle	NDIR
TÜV Data	
Approval Report	936/21211670/B / 2010-03-26
Editor	Schneider
Date	2010-03-26
Measurement Component	CO
Certificated range	200 mg/m³

Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	0.00 mg/m³
Sum of negative CS at zero point	0.00 mg/m³
Sum of postive CS at reference point	6.76 mg/m³
Sum of negative CS at reference point	0.00 mg/m³
Maximum sum of cross sensitivities	6.76 mg/m³
Uncertainty of cross sensitivity	3.90 mg/m³

Calculation of the combined standard uncertainty

Test Value		u	u²
Standard deviation from paired measurements under field conditions *	u_D	1.588 mg/m³	2.522 (mg/m³)²
Lack of fit	u_{lof}	1.155 mg/m³	1.334 (mg/m³)²
Zero drift from field test	$u_{d,z}$	0.924 mg/m³	0.854 (mg/m³)²
Span drift from field test	$u_{d,s}$	-3.002 mg/m³	9.012 (mg/m³)²
Influence of ambient temperature at span	u_t	2.406 mg/m³	5.789 (mg/m³)²
Influence of supply voltage	u_v	0.157 mg/m³	0.025 (mg/m³)²
Cross sensitivity (interference)	u_i	3.903 mg/m³	15.233 (mg/m³)²
Influence of sample gas flow	u_p	0.127 mg/m³	0.016 (mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	1.617 mg/m³	2.613 (mg/m³)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	6.12 mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	11.99 mg/m³

Relative total expanded uncertainty	**U in % of the ELV 160 mg/m³**	**7.5**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 160 mg/m³**	**10.0**
Requirement of EN 15267-3	U in % of the ELV 160 mg/m³	7.5

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 UNOR for NO
Serial Number	TÜV 1 / TÜV 3
Measuring Principle	NDIR
TÜV Data	
Approval Report	936/21211670/A / 2009-10-29
Editor	Schneider
Date	2009-10-29
Measurement Component	NO
Certificated range	100 mg/m³

Evaluation of the cross sensitivity (CS)	
Sum of positive CS at zero point	1.56 mg/m³
Sum of negative CS at zero point	0.00 mg/m³
Sum of postive CS at reference point	2.46 mg/m³
Sum of negative CS at reference point	-0.73 mg/m³
Maximum sum of cross sensitivities	2.46 mg/m³
Uncertainty of cross sensitivity	1.42 mg/m³

Calculation of the combined standard uncertainty

Test Value		u	u²
Standard deviation from paired measurements under field conditions *	u_D	1.191 mg/m³	1.418 (mg/m³)²
Lack of fit	u_{lof}	0.231 mg/m³	0.053 (mg/m³)²
Zero drift from field test	$u_{d,z}$	-1.212 mg/m³	1.469 (mg/m³)²
Span drift from field test	$u_{d,s}$	1.732 mg/m³	3.000 (mg/m³)²
Influence of ambient temperature at span	u_t	0.529 mg/m³	0.280 (mg/m³)²
Influence of supply voltage	u_v	0.142 mg/m³	0.020 (mg/m³)²
Cross sensitivity (interference)	u_i	1.420 mg/m³	2.017 (mg/m³)²
Influence of sample gas flow	u_p	-0.104 mg/m³	0.011 (mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.808 mg/m³	0.653 (mg/m³)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	2.99 mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	5.85 mg/m³

Relative total expanded uncertainty	**U in % of the ELV 50 mg/m³**	**11.7**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 50 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 50 mg/m³	15.0

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 MULTOR for NO
Serial Number	TÜV 1 / TÜV 3
Measuring Principle	NDIR
TÜV Data	
Approval Report	936/21211670/B / 2010-03-26
Editor	Schneider
Date	2010-03-26
Measurement Component	NO
Certificated range	250 mg/m³

Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	8.95 mg/m³
Sum of negative CS at zero point	-4.43 mg/m³
Sum of postive CS at reference point	3.45 mg/m³
Sum of negative CS at reference point	-3.65 mg/m³
Maximum sum of cross sensitivities	8.95 mg/m³
Uncertainty of cross sensitivity	5.17 mg/m³

Calculation of the combined standard uncertainty

Test Value		u	u²
Standard deviation from paired measurements under field conditions *	u_D	2.241 mg/m³	5.022 (mg/m³)²
Lack of fit	u_{lof}	-1.155 mg/m³	1.334 (mg/m³)²
Zero drift from field test	$u_{d,z}$	2.742 mg/m³	7.519 (mg/m³)²
Span drift from field test	$u_{d,s}$	4.186 mg/m³	17.523 (mg/m³)²
Influence of ambient temperature at span	u_t	0.950 mg/m³	0.903 (mg/m³)²
Influence of supply voltage	u_v	0.737 mg/m³	0.543 (mg/m³)²
Cross sensitivity (interference)	u_i	5.167 mg/m³	26.701 (mg/m³)²
Influence of sample gas flow	u_p	0.277 mg/m³	0.077 (mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	2.021 mg/m³	4.083 (mg/m³)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	7.98 mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	15.64 mg/m³

Relative total expanded uncertainty	**U in % of the ELV 131 mg/m³**	**11.9**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 131 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 131 mg/m³	15.0
Requirement for standard reference methods	U in % of the ELV 131 mg/m³	10.0

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 DEFOR for NO
Serial Number	TÜV 2 / TÜV 4
Measuring Principle	UVRAS
TÜV Data	
Approval Report	936/21211670/A / 2009-10-29
Editor	Schneider
Date	2009-10-29
Measurement Component	NO
Certificated range	50 mg/m³

Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	1.86 mg/m³
Sum of negative CS at zero point	0.00 mg/m³
Sum of postive CS at reference point	1.06 mg/m³
Sum of negative CS at reference point	-0.94 mg/m³
Maximum sum of cross sensitivities	1.86 mg/m³
Uncertainty of cross sensitivity	1.07 mg/m³

Calculation of the combined standard uncertainty

Test Value		u	u²
Standard deviation from paired measurements under field conditions *	u_D	0.751 mg/m³	0.564 (mg/m³)²
Lack of fit	u_{lof}	-0.115 mg/m³	0.013 (mg/m³)²
Zero drift from field test	$u_{d,z}$	0.375 mg/m³	0.141 (mg/m³)²
Span drift from field test	$u_{d,s}$	0.866 mg/m³	0.750 (mg/m³)²
Influence of ambient temperature at span	u_t	0.153 mg/m³	0.023 (mg/m³)²
Influence of supply voltage	u_v	0.233 mg/m³	0.054 (mg/m³)²
Cross sensitivity (interference)	u_i	1.074 mg/m³	1.153 (mg/m³)²
Influence of sample gas flow	u_p	0.052 mg/m³	0.003 (mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.404 mg/m³	0.163 (mg/m³)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	1.69 mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	3.32 mg/m³

Relative total expanded uncertainty	**U in % of the ELV 30 mg/m³**	**11.1**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 30 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 30 mg/m³	15.0

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data

Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 DEFOR für NO_2
Serial Number	TÜV 2 / TÜV 4
Measuring Principle	UVRAS

TÜV Data

Approval Report	936/21211670/A / 2009-10-29
Editor	Schneider
Date	2009-10-29

Measurement Component	NO_2
Certificated range	50 mg/m³

Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	1.72 mg/m³
Sum of negative CS at zero point	0.00 mg/m³
Sum of postive CS at reference point	1.93 mg/m³
Sum of negative CS at reference point	-0.26 mg/m³
Maximum sum of cross sensitivities	1.93 mg/m³
Uncertainty of cross sensitivity	1.11 mg/m³

Calculation of the combined standard uncertainty

Test Value		u		u^2	
Repeatability standard deviation at span *	u_r	0.520	mg/m³	0.270	$(mg/m^3)^2$
Lack of fit	u_{lof}	-0.231	mg/m³	0.053	$(mg/m^3)^2$
Zero drift from field test	$u_{d,z}$	-0.693	mg/m³	0.480	$(mg/m^3)^2$
Span drift from field test	$u_{d,s}$	0.866	mg/m³	0.750	$(mg/m^3)^2$
Influence of ambient temperature at span	u_t	0.458	mg/m³	0.210	$(mg/m^3)^2$
Influence of supply voltage	u_v	0.110	mg/m³	0.012	$(mg/m^3)^2$
Cross sensitivity (interference)	u_i	1.114	mg/m³	1.242	$(mg/m^3)^2$
Influence of sample gas flow	u_p	0.030	mg/m³	0.001	$(mg/m^3)^2$
Uncertainty of reference material at 70% of certification range	u_{rm}	0.404	mg/m³	0.163	$(mg/m^3)^2$

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	1.78	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	3.50	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 50 mg/m³**	**7.0**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 50 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 50 mg/m³	15.0

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 UNOR for SO_2
Serial Number	TÜV 2 / TÜV 4
Measuring Principle	NDIR
TÜV Data	
Approval Report	936/21211670/A / 2009-10-29
Editor	Schneider
Date	2009-10-29
Measurement Component	SO_2
Certificated range	75 mg/m³

Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	2.75 mg/m³
Sum of negative CS at zero point	-1.75 mg/m³
Sum of postive CS at reference point	2.30 mg/m³
Sum of negative CS at reference point	-1.82 mg/m³
Maximum sum of cross sensitivities	2.75 mg/m³
Uncertainty of cross sensitivity	1.58 mg/m³

Calculation of the combined standard uncertainty

Test Value		u	u²
Standard deviation from paired measurements under field conditions *	u_D	1.228 mg/m³	1.508 (mg/m³)²
Lack of fit	u_{lof}	0.410 mg/m³	0.168 (mg/m³)²
Zero drift from field test	$u_{d,z}$	-1.212 mg/m³	1.469 (mg/m³)²
Span drift from field test	$u_{d,s}$	1.299 mg/m³	1.687 (mg/m³)²
Influence of ambient temperature at span	u_t	0.929 mg/m³	0.863 (mg/m³)²
Influence of supply voltage	u_v	0.227 mg/m³	0.052 (mg/m³)²
Cross sensitivity (interference)	u_i	1.585 mg/m³	2.512 (mg/m³)²
Influence of sample gas flow	u_p	0.057 mg/m³	0.003 (mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.606 mg/m³	0.368 (mg/m³)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	2.94 mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	5.76 mg/m³

Relative total expanded uncertainty	**U in % of the ELV 50 mg/m³**	**11.5**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 50 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 50 mg/m³	15.0

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data			
Manufacturer		Sick Maihak	
Name of measuring system		MKAS S800 MULTOR for SO_2	
Serial Number		TÜV 1 / TÜV 3	
Measuring Principle		NDIR	
TÜV Data			
Approval Report		936/21211670/B / 2010-03-26	
Editor		Schneider	
Date		2010-03-26	
Measurement Component		SO_2	
Certificated range		250 mg/m³	
Evaluation of the cross sensitivity (CS)			
Sum of positive CS at zero point		9.63 mg/m³	
Sum of negative CS at zero point		-2.65 mg/m³	
Sum of postive CS at reference point		5.93 mg/m³	
Sum of negative CS at reference point		-1.20 mg/m³	
Maximum sum of cross sensitivities		9.63 mg/m³	
Uncertainty of cross sensitivity		5.56 mg/m³	

Calculation of the combined standard uncertainty

Test Value		u	u²
Standard deviation from paired measurements under field conditions *	u_D	1.546 mg/m³	2.390 (mg/m³)²
Lack of fit	u_{lof}	-2.714 mg/m³	7.366 (mg/m³)²
Zero drift from field test	$u_{d,z}$	2.115 mg/m³	4.473 (mg/m³)²
Span drift from field test	$u_{d,s}$	-3.002 mg/m³	9.012 (mg/m³)²
Influence of ambient temperature at span	u_t	2.901 mg/m³	8.416 (mg/m³)²
Influence of supply voltage	u_v	0.839 mg/m³	0.704 (mg/m³)²
Cross sensitivity (interference)	u_i	5.557 mg/m³	30.880 (mg/m³)²
Influence of sample gas flow	u_p	-0.410 mg/m³	0.168 (mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	2.021 mg/m³	4.083 (mg/m³)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	8.22 mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	16.10 mg/m³

Relative total expanded uncertainty	**U in % of the ELV 150 mg/m³**	**10.7**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 150 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 150 mg/m³	15.0
	U in % of the ELV 150 mg/m³	10.0

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 DEFOR for SO_2
Serial Number	TÜV 2 / TÜV 4
Measuring Principle	UVRAS
TÜV Data	
Approval Report	936/21211670/A / 2009-10-29
Editor	Schneider
Date	2009-10-29
Measurement Component	SO_2
Certificated range	75 mg/m³

Evaluation of the cross sensitivity (CS)	
Sum of positive CS at zero point	0.00 mg/m³
Sum of negative CS at zero point	-0.81 mg/m³
Sum of postive CS at reference point	0.35 mg/m³
Sum of negative CS at reference point	-2.91 mg/m³
Maximum sum of cross sensitivities	-2.91 mg/m³
Uncertainty of cross sensitivity	-1.68 mg/m³

Calculation of the combined standard uncertainty

Test Value		u	u²
Standard deviation from paired measurements under field conditions *	u_D	1.206 mg/m³	1.454 (mg/m³)²
Lack of fit	u_{lof}	-0.404 mg/m³	0.163 (mg/m³)²
Zero drift from field test	$u_{d,z}$	-0.606 mg/m³	0.367 (mg/m³)²
Span drift from field test	$u_{d,s}$	1.299 mg/m³	1.687 (mg/m³)²
Influence of ambient temperature at span	u_t	0.964 mg/m³	0.929 (mg/m³)²
Influence of supply voltage	u_v	0.067 mg/m³	0.004 (mg/m³)²
Cross sensitivity (interference)	u_i	-1.680 mg/m³	2.823 (mg/m³)²
Influence of sample gas flow	u_p	0.075 mg/m³	0.006 (mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.606 mg/m³	0.368 (mg/m³)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	2.79 mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	5.47 mg/m³

Relative total expanded uncertainty	**U in % of the ELV 50 mg/m³**	**10.9**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 50 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 50 mg/m³	15.0

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 UNOR for CH_4
Serial Number	TÜV 2 / TÜV 4
Measuring Principle	NDIR
TÜV Data	
Approval Report	936/21211670/A / 2009-10-19
Editor	Schneider
Date	2009-10-29
Measurement Component	CH_4
Certificated range	50 mg/m³

Evaluation of the cross sensitivity (CS)	
Sum of positive CS at zero point	0.48 mg/m³
Sum of negative CS at zero point	-1.77 mg/m³
Sum of postive CS at reference point	0.00 mg/m³
Sum of negative CS at reference point	-0.63 mg/m³
Maximum sum of cross sensitivities	-1.77 mg/m³
Uncertainty of cross sensitivity	-1.02 mg/m³

Calculation of the combined standard uncertainty

Test Value		u		u^2	
Repeatability standard deviation at span *	u_r	0.630	mg/m³	0.397	$(mg/m^3)^2$
Lack of fit	u_{lof}	0.231	mg/m³	0.053	$(mg/m^3)^2$
Zero drift from field test	$u_{d,z}$	0.520	mg/m³	0.270	$(mg/m^3)^2$
Span drift from field test	$u_{d,s}$	0.635	mg/m³	0.403	$(mg/m^3)^2$
Influence of ambient temperature at span	u_t	0.416	mg/m³	0.173	$(mg/m^3)^2$
Influence of supply voltage	u_v	0.306	mg/m³	0.094	$(mg/m^3)^2$
Cross sensitivity (interference)	u_i	-1.022	mg/m³	1.044	$(mg/m^3)^2$
Influence of sample gas flow	u_p	-0.035	mg/m³	0.001	$(mg/m^3)^2$
Uncertainty of reference material at 70% of certification range	u_{rm}	0.404	mg/m³	0.163	$(mg/m^3)^2$

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	1.61	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	3.16	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 20 mg/m³**	**15.8**
Requirement of 2000/76/EC and 2001/80/EC**	**U in % of the ELV 20 mg/m³**	**30.0**
Requirement of EN 15267-3	U in % of the ELV 20 mg/m³	22.5

** For this component no requirements in the EC-directives 2001/80/EC und 2000/76/EC are given.
The chosen value was recommended by the certification body.

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 MULTOR for CH_4
Serial Number	TÜV 2 / TÜV 4
Measuring Principle	NDIR
TÜV Data	
Approval Report	936/21211670/A / 2009-10-19
Editor	Schneider
Date	2009-10-29
Measurement Component	CH_4
Certificated range	286 mg/m³

Evaluation of the cross sensitivity (CS)	
Sum of positive CS at zero point	0.00 mg/m³
Sum of negative CS at zero point	0.00 mg/m³
Sum of postive CS at reference point	1.06 mg/m³
Sum of negative CS at reference point	-1.49 mg/m³
Maximum sum of cross sensitivities	-1.49 mg/m³
Uncertainty of cross sensitivity	-0.86 mg/m³

Calculation of the combined standard uncertainty

Test Value		u		u²	
Repeatability standard deviation at span *	u_r	0.620	mg/m³	0.384	(mg/m³)²
Lack of fit	u_{lof}	-1.501	mg/m³	2.253	(mg/m³)²
Zero drift from field test	$u_{d,z}$	1.156	mg/m³	1.336	(mg/m³)²
Span drift from field test	$u_{d,s}$	-2.972	mg/m³	8.833	(mg/m³)²
Influence of ambient temperature at span	u_t	2.843	mg/m³	8.083	(mg/m³)²
Influence of supply voltage	u_v	0.532	mg/m³	0.283	(mg/m³)²
Cross sensitivity (interference)	u_i	-0.859	mg/m³	0.737	(mg/m³)²
Influence of sample gas flow	u_p	0.370	mg/m³	0.137	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	2.312	mg/m³	5.344	(mg/m³)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	5.23 mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	10.26 mg/m³

Relative total expanded uncertainty	**U in % of the ELV 100 mg/m³**	**10.3**
Requirement of 2000/76/EC and 2001/80/EC**	**U in % of the ELV 100 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 100 mg/m³	15.0

** For this component no requirements in the EC-directives 2001/80/EC und 2000/76/EC are given. The chosen value was recommended by the certification body.

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 UNOR for N_2O
Serial Number	TÜV 2 / TÜV 4
Measuring Principle	NDIR
TÜV Data	
Approval Report	936/21211670/B / 2010-03-26
Editor	Schneider
Date	2010-03-26
Measurement Component	N_2O
Certificated range	50 mg/m³

Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	0.93 mg/m³
Sum of negative CS at zero point	-1.41 mg/m³
Sum of postive CS at reference point	0.00 mg/m³
Sum of negative CS at reference point	-0.65 mg/m³
Maximum sum of cross sensitivities	-1.41 mg/m³
Uncertainty of cross sensitivity	-0.81 mg/m³

Calculation of the combined standard uncertainty

Test Value		u		u²	
Standard deviation from paired measurements under field conditions *	u_D	0.410	mg/m³	0.168	(mg/m³)²
Lack of fit	u_{lof}	0.231	mg/m³	0.053	(mg/m³)²
Zero drift from field test	$u_{d,z}$	-0.318	mg/m³	0.101	(mg/m³)²
Span drift from field test	$u_{d,s}$	0.866	mg/m³	0.750	(mg/m³)²
Influence of ambient temperature at span	u_t	0.436	mg/m³	0.190	(mg/m³)²
Influence of supply voltage	u_v	0.172	mg/m³	0.030	(mg/m³)²
Cross sensitivity (interference)	u_i	-0.814	mg/m³	0.663	(mg/m³)²
Influence of sample gas flow	u_p	0.052	mg/m³	0.003	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.404	mg/m³	0.163	(mg/m³)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	1.46	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	2.85	mg/m³

Relative total expanded uncertainty	**U in % of the range 50 mg/m³**	**5.7**
Requirement of 2000/76/EC and 2001/80/EC**	**U in % of the range 50 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the range 50 mg/m³	15.0

** For this component no requirements in the EC-directives 2001/80/EC und 2000/76/EC are given. The chosen value was recommended by the certification body.

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 UNOR for CO_2
Serial Number	TÜV 1 / TÜV 3
Measuring Principle	NDIR
TÜV Data	
Approval Report	936/21211670/B / 2010-03-26
Editor	Schneider
Date	2010-03-26
Measurement Component	CO_2
Certificated range	25 Vol.-%

Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	0.00 Vol.-%
Sum of negative CS at zero point	-0.47 Vol.-%
Sum of postive CS at reference point	0.00 Vol.-%
Sum of negative CS at reference point	0.00 Vol.-%
Maximum sum of cross sensitivities	-0.47 Vol.-%
Uncertainty of cross sensitivity	-0.27 Vol.-%

Calculation of the combined standard uncertainty

Test Value		u		u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.156	Vol.-%	0.024	(Vol.-%)²
Lack of fit	u_{lof}	-0.144	Vol.-%	0.021	(Vol.-%)²
Zero drift from field test	$u_{d,z}$	-0.188	Vol.-%	0.035	(Vol.-%)²
Span drift from field test	$u_{d,s}$	0.346	Vol.-%	0.120	(Vol.-%)²
Influence of ambient temperature at span	u_t	0.300	Vol.-%	0.090	(Vol.-%)²
Influence of supply voltage	u_v	0.049	Vol.-%	0.002	(Vol.-%)²
Cross sensitivity (interference)	u_i	-0.271	Vol.-%	0.074	(Vol.-%)²
Influence of sample gas flow	u_p	0.017	Vol.-%	0.000	(Vol.-%)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.202	Vol.-%	0.041	(Vol.-%)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.64 Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	1.25 Vol.-%

Relative total expanded uncertainty	**U in % of the ELV 25 Vol.-%**	**5.0**
Requirement of 2000/76/EC and 2001/80/EC**	**U in % of the ELV 25 Vol.-%**	**10.0**
Requirement of EN 15267-3	U in % of the ELV 25 Vol.-%	7.5

** For this component no requirements in the EC-directives 2001/80/EC und 2000/76/EC are given. The chosen value was recommended by the certification body.

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 MULTOR for CO_2
Serial Number	TÜV 2 / TÜV 4
Measuring Principle	NDIR
TÜV Data	
Approval Report	936/21211670/A / 2009-10-29
Editor	Schneider
Date	2009-10-29
Measurement Component	CO_2
Certificated range	25 Vol.-%

Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	0.00 Vol.-%
Sum of negative CS at zero point	0.00 Vol.-%
Sum of postive CS at reference point	0.10 Vol.-%
Sum of negative CS at reference point	-0.09 Vol.-%
Maximum sum of cross sensitivities	0.10 Vol.-%
Uncertainty of cross sensitivity	0.06 Vol.-%

Calculation of the combined standard uncertainty

Test Value		u	u^2
Standard deviation from paired measurements under field conditions *	u_D	0.165 Vol.-%	0.027 (Vol.-%)²
Lack of fit	u_{lof}	-0.237 Vol.-%	0.056 (Vol.-%)²
Zero drift from field test	$u_{d,z}$	-0.188 Vol.-%	0.035 (Vol.-%)²
Span drift from field test	$u_{d,s}$	0.433 Vol.-%	0.187 (Vol.-%)²
Influence of ambient temperature at span	u_t	0.115 Vol.-%	0.013 (Vol.-%)²
Influence of supply voltage	u_v	0.015 Vol.-%	0.000 (Vol.-%)²
Cross sensitivity (interference)	u_i	0.058 Vol.-%	0.003 (Vol.-%)²
Influence of sample gas flow	u_p	0.029 Vol.-%	0.001 (Vol.-%)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.202 Vol.-%	0.041 (Vol.-%)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.60 Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	1.18 Vol.-%

Relative total expanded uncertainty	**U in % of the range 25 Vol.-%**	**4.7**
Requirement of 2000/76/EC and 2001/80/EC**	**U in % of the range 25 Vol.-%**	**10.0**
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	7.5

** For this component no requirements in the EC-directives 2001/80/EC und 2000/76/EC are given. The chosen value was recommended by the certification body.

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 OXOR-P for O_2
Serial Number	TÜV 1 / TÜV 3
Measuring Principle	paramagnetic
TÜV Data	
Approval Report	936/21211670/A / 2009-10-29
Editor	Schneider
Date	2009-10-29
Measurement Component	O_2
Certificated range	25 Vol.-%

Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	0.00 Vol.-%
Sum of negative CS at zero point	0.00 Vol.-%
Sum of postive CS at reference point	0.00 Vol.-%
Sum of negative CS at reference point	0.00 Vol.-%
Maximum sum of cross sensitivities	0.00 Vol.-%
Uncertainty of cross sensitivity	0.00 Vol.-%

Calculation of the combined standard uncertainty

Test Value		u	u^2
Standard deviation from paired measurements under field conditions *	u_D	0.084 Vol.-%	0.007 (Vol.-%)²
Lack of fit	u_{lof}	-0.040 Vol.-%	0.002 (Vol.-%)²
Zero drift from field test	$u_{d,z}$	0.120 Vol.-%	0.014 (Vol.-%)²
Span drift from field test	$u_{d,s}$	0.120 Vol.-%	0.014 (Vol.-%)²
Influence of ambient temperature at span	u_t	0.110 Vol.-%	0.012 (Vol.-%)²
Influence of supply voltage	u_v	0.003 Vol.-%	0.000 (Vol.-%)²
Cross sensitivity (interference)	u_i	0.000 Vol.-%	0.000 (Vol.-%)²
Influence of sample gas flow	u_p	-0.023 Vol.-%	0.001 (Vol.-%)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.202 Vol.-%	0.041 (Vol.-%)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.30 Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.59 Vol.-%

Relative total expanded uncertainty	**U in % of the range 25 Vol.-%**	**2.4**
Requirement of 2000/76/EC and 2001/80/EC**	**U in % of the range 25 Vol.-%**	**10.0**
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	7.5

** For this component no requirements in the EC-directives 2001/80/EC und 2000/76/EC are given. The chosen value was recommended by the certification body.

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data	
Manufacturer	Sick Maihak
Name of measuring system	MKAS S800 OXOR-E for O_2
Serial Number	TÜV 2 / TÜV 4
Measuring Principle	electrochemical cell
TÜV Data	
Approval Report	936/21211670/B / 2010-03-26
Editor	Schneider
Date	2010-03-26
Measurement Component	O_2
Certificated range	25 Vol.-%

Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	0.00 Vol.-%
Sum of negative CS at zero point	0.00 Vol.-%
Sum of postive CS at reference point	0.33 Vol.-%
Sum of negative CS at reference point	0.00 Vol.-%
Maximum sum of cross sensitivities	0.33 Vol.-%
Uncertainty of cross sensitivity	0.19 Vol.-%

Calculation of the combined standard uncertainty

Test Value		u	u²
Standard deviation from paired measurements under field conditions *	u_D	0.108 Vol.-%	0.012 (Vol.-%)²
Lack of fit	u_{lof}	0.058 Vol.-%	0.003 (Vol.-%)²
Zero drift from field test	$u_{d,z}$	0.120 Vol.-%	0.014 (Vol.-%)²
Span drift from field test	$u_{d,s}$	0.120 Vol.-%	0.014 (Vol.-%)²
Influence of ambient temperature at span	u_t	0.127 Vol.-%	0.016 (Vol.-%)²
Influence of supply voltage	u_v	0.030 Vol.-%	0.001 (Vol.-%)²
Cross sensitivity (interference)	u_i	0.191 Vol.-%	0.036 (Vol.-%)²
Influence of sample gas flow	u_p	0.029 Vol.-%	0.001 (Vol.-%)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.202 Vol.-%	0.041 (Vol.-%)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.37 Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1{,}96$	0.73 Vol.-%

Relative total expanded uncertainty	**U in % of the ELV 25 Vol.-%**	**2.9**
Requirement of 2000/76/EC and 2001/80/EC**	**U in % of the ELV 25 Vol.-%**	**10.0**
Requirement of EN 15267-3	U in % of the ELV 25 Vol.-%	7.5
Requirement for standard reference methods	U in % of the ELV 25 Vol.-%	6.0

** For this component no requirements in the EC-directives 2001/80/EC und 2000/76/EC are given.
The chosen value was recommended by the certification body.