



QAL1 Report

Description of evaluated measurement procedure

Automated Measuring System (AMS) based on
Analyzer module serial number (optional)
Quotation or order number
Intended for monitoring of
Applicable EU directive
Name of plant
Gas to be measured
Smallest range of AMS
Largest range of AMS (optional)
Smallest certified range for AMS

AO2000-Limas11 SO2	
32470165	
Large combustion plant	
2001/80/EC	
ISOLA 6	
SO2	
30000	mg/m ³
30000	mg/m ³
75	mg/m ³

Test value and required quality at that value

Test concentration (Emission Limit Value, ELV)

750	mg/m ³

Required measurement quality as 95% confidence interval

20	% of ELV
----	----------

Shortest averaging time of measured values

30	minutes
----	---------

Required response time

25	% of shortest averaging time
----	------------------------------

Field conditions of operation used in the uncertainty assessment

Ambient temperature range

Min. value	Max. value	
20	25	°C
970	1030	hPa
30	90	l/h
190	250	V

Ambient pressure range

Flow range

Voltage range

Internal diameter of sample gas line

6	mm
---	----

Length of sample gas line

40	m
----	---

Average flow of sample gas

60	l/h
----	-----

Time between (automatic) span calibration

7	days
---	------

Ranges of chemical interferents for

Combustion process

Component

O2

H2O

CO

CO2

CH4

N2O

NO

NO2

NH3

HCl

SO2

Min. value	Max. value	
3	21	Vol. %
1	30	Vol. %
0	300	mg/m ³
0	15	Vol. %
0	50	mg/m ³
0	20	mg/m ³
0	300	mg/m ³
0	30	mg/m ³
0	20	mg/m ³
0	50	mg/m ³
0	200	mg/m ³



QAL1 Report

(continued)

Contributing partial standard uncertainties and reference to their origins

Selectivity H ₂ O	0,05	mg/m ³
Selectivity others (largest sum)	1,30	mg/m ³
Lack of fit	0,17	mg/m ³
Drift	8,66	mg/m ³
Pressure dependence	0,00	mg/m ³
Temperature dependence	0,57	mg/m ³
Flow dependence	0,43	mg/m ³
Voltage dependence	0,00	mg/m ³
Repeatability	0,61	mg/m ³
Uncertainty of response factors	0,00	mg/m ³
Uncertainty of converter efficiency (SCC-K NO _x converter)	0,00	mg/m ³
Response time	169	seconds
Origin of data	Report of TÜV suitability test, 08/2000 (Gerät 1)	
Long-term drift of calibration cell	1,30	mg/m ³
Origin of data	Article in UmweltMagazin, 2001	
Uncertainty of SRM	4,84	mg/m ³
Standard Reference Method (SRM), Reference	Ion chromatography, ISO 11632	
Uncertainty of cylinder gas	7,50	mg/m ³
Origin of data	Datasheet of gas supplier	

Determination and assessment of expanded uncertainty

Expanded uncertainty	24,71	mg/m ³
Required measurement quality as 95% confidence interval	150,00	mg/m ³
Confidence interval met	YES	
Total response time	237	seconds
Required response time	450	seconds
Response time met	YES	
Conclusion	The AMS is ACCEPTABLE	

This report confirms that the product
AO2000-Limas11 SO₂
operating with system components as described in §3 of the TÜV suitability test report
complies with the requirements of EN 14181:2004 QAL1
according to the International Standard ISO 14956:2002
for the above specified operating conditions.