



## 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 NO	
3-242498-3	
CC2	
Large combustion plant	
2001/80/EC	
Enipower Ravenna	
NO	
75	mg/m <sup>3</sup>
75	mg/m <sup>3</sup>
33,5	mg/m <sup>3</sup>

### Test value and required quality at that value

Test concentration (Emission Limit Value, ELV)  
Equivalent NO<sub>2</sub> concentration  
Required measurement quality as 95% confidence interval  
Shortest averaging time of measured values  
Required response time

31	mg/m <sup>3</sup>
48	mg/m <sup>3</sup>
20	% of ELV
30	minutes
25	% of shortest averaging time

### Field conditions of operation used in the uncertainty assessment

Ambient temperature range  
Ambient pressure range  
Flow range  
Voltage range

Min. value	Max. value	
5	30	°C
980	1010	hPa
50	90	l/h
190	250	V

Internal diameter of sample gas line  
Length of sample gas line  
Average flow of sample gas

4	mm
50	m
70	l/h

Time between (automatic) span calibration

7	days
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Ranges of chemical interferences for

#### Combustion process

Component

O<sub>2</sub>  
H<sub>2</sub>O  
CO  
CO<sub>2</sub>  
CH<sub>4</sub>  
N<sub>2</sub>O  
NO  
NO<sub>2</sub>  
NH<sub>3</sub>  
HCl  
SO<sub>2</sub>

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





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(continued)

### Contributing partial standard uncertainties and reference to their origins

Selectivity H <sub>2</sub> O	0,07	mg/m <sup>3</sup>
Selectivity others (largest sum)	1,07	mg/m <sup>3</sup>
Lack of fit	0,02	mg/m <sup>3</sup>
Drift	0,29	mg/m <sup>3</sup>
Pressure dependence	0,00	mg/m <sup>3</sup>
Temperature dependence	0,24	mg/m <sup>3</sup>
Flow dependence	0,13	mg/m <sup>3</sup>
Voltage dependence	0,00	mg/m <sup>3</sup>
Repeatability	0,20	mg/m <sup>3</sup>
Uncertainty of response factors	0,00	mg/m <sup>3</sup>
Uncertainty of converter efficiency (SCC-K NO <sub>x</sub> converter)	0,00	mg/m <sup>3</sup>
Response time	26	seconds

*Report of TÜV suitability test, 02/2001 (Gerät 1)*

Long-term drift of calibration cell  
Origin of data

0,05 mg/m<sup>3</sup>

*Article in UmweltMagazin, 2001*

Uncertainty of SRM  
Standard Reference Method (SRM), Reference

0,40 mg/m<sup>3</sup>

*Ion chromatography, VDI 2456*

Uncertainty of cylinder gas  
Origin of data

0,31 mg/m<sup>3</sup>

*Datasheet of gas supplier*

### Determination and assessment of expanded uncertainty

Expanded uncertainty	2,48	mg/m <sup>3</sup>
Required measurement quality as 95% confidence interval	6,20	mg/m <sup>3</sup>
<b>Confidence interval met</b>	<b>YES</b>	

Total response time	58	seconds
Required response time	450	seconds
<b>Response time met</b>	<b>YES</b>	

**Conclusion**

**The AMS is ACCEPTABLE**

This report confirms that the product  
**AO2000-Limas11 NO**  
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.