



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 | |
| 3-242497-3 | |
| CC1 | |
| Large combustion plant | |
| 2001/80/EC | |
| Enipower Ravenna | |
| NO | |
| 75 | mg/m ³ |
| 75 | mg/m ³ |
| 33,5 | mg/m ³ |
| | |

Test value and required quality at that value

Test concentration (Emission Limit Value, ELV)
Equivalent NO₂ concentration
Required measurement quality as 95% confidence interval
Shortest averaging time of measured values
Required response time

| | |
|----|------------------------------|
| 31 | mg/m ³ |
| 48 | mg/m ³ |
| 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 |
|---|------|

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 | 0,07 | mg/m ³ |
| Selectivity others (largest sum) | 1,07 | mg/m ³ |
| Lack of fit | 0,02 | mg/m ³ |
| Drift | 0,29 | mg/m ³ |
| Pressure dependence | 0,00 | mg/m ³ |
| Temperature dependence | 0,24 | mg/m ³ |
| Flow dependence | 0,13 | mg/m ³ |
| Voltage dependence | 0,00 | mg/m ³ |
| Repeatability | 0,20 | 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 | 26 | seconds |
| Origin of data | <i>Report of TÜV suitability test, 02/2001 (Gerät 1)</i> | |

| | | |
|--|---------------------------------------|-------------------|
| Long-term drift of calibration cell | 0,05 | mg/m ³ |
| Origin of data | <i>Article in UmweltMagazin, 2001</i> | |
| Uncertainty of SRM | 0,40 | mg/m ³ |
| Standard Reference Method (SRM), Reference | <i>Ion chromatography, VDI 2456</i> | |
| Uncertainty of cylinder gas | 0,31 | mg/m ³ |
| Origin of data | <i>Datasheet of gas supplier</i> | |

Determination and assessment of expanded uncertainty

| | | |
|---|------------|-------------------|
| Expanded uncertainty | 2,48 | mg/m ³ |
| Required measurement quality as 95% confidence interval | 6,20 | mg/m ³ |
| Confidence interval met | YES | |
| Total response time | 58 | seconds |
| Required response time | 450 | seconds |
| Response time met | YES | |

| | |
|-------------------|------------------------------|
| 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.