



## 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-Uras14 CO       |                   |
| 3-242470-3             |                   |
| CC1                    |                   |
| Large combustion plant |                   |
| 2001/80/EC             |                   |
| Enipower Ravenna       |                   |
| CO                     |                   |
| 75                     | mg/m <sup>3</sup> |
| 75                     | mg/m <sup>3</sup> |
| 75                     | mg/m <sup>3</sup> |

### Test value and required quality at that value

Test concentration (Emission Limit Value, ELV)

|    |                   |
|----|-------------------|
| 30 | mg/m <sup>3</sup> |
|----|-------------------|

Required measurement quality as 95% confidence interval

|    |          |
|----|----------|
| 10 | % 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 |     |
|------------|------------|-----|
| 5          | 30         | °C  |
| 980        | 1010       | hPa |
| 50         | 90         | l/h |
| 190        | 250        | V   |

Ambient pressure range

Flow range

Voltage range

Internal diameter of sample gas line

|   |    |
|---|----|
| 4 | mm |
|---|----|

Length of sample gas line

|    |   |
|----|---|
| 50 | m |
|----|---|

Average flow of sample gas

|    |     |
|----|-----|
| 70 | l/h |
|----|-----|

Time between (automatic) span calibration

|   |      |
|---|------|
| 7 | days |
|---|------|

Ranges of chemical interferents 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> |





## QAL1 Report

(continued)

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

|                                                                       |                                                          |                   |
|-----------------------------------------------------------------------|----------------------------------------------------------|-------------------|
| Selectivity H <sub>2</sub> O                                          | 0,04                                                     | mg/m <sup>3</sup> |
| Selectivity others (largest sum)                                      | 0,68                                                     | mg/m <sup>3</sup> |
| Lack of fit                                                           | 0,09                                                     | mg/m <sup>3</sup> |
| Drift                                                                 | 0,42                                                     | mg/m <sup>3</sup> |
| Pressure dependence                                                   | 0,00                                                     | mg/m <sup>3</sup> |
| Temperature dependence                                                | 0,15                                                     | mg/m <sup>3</sup> |
| Flow dependence                                                       | 0,06                                                     | mg/m <sup>3</sup> |
| Voltage dependence                                                    | 0,00                                                     | mg/m <sup>3</sup> |
| Repeatability                                                         | 0,06                                                     | 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                                                         | 61                                                       | seconds           |
| Origin of data                                                        | <i>Report of TÜV suitability test, 08/1997 (Gerät 1)</i> |                   |

|                                            |                                       |                   |
|--------------------------------------------|---------------------------------------|-------------------|
| Long-term drift of calibration cell        | 0,05                                  | mg/m <sup>3</sup> |
| Origin of data                             | <i>Article in UmweltMagazin, 2001</i> |                   |
| Uncertainty of SRM                         | 0,19                                  | mg/m <sup>3</sup> |
| Standard Reference Method (SRM), Reference | <i>NDIR, VDI 2459 Bl.6</i>            |                   |
| Uncertainty of cylinder gas                | 0,30                                  | mg/m <sup>3</sup> |
| Origin of data                             | <i>Datasheet of gas supplier</i>      |                   |

### Determination and assessment of expanded uncertainty

|                                                         |            |                   |
|---------------------------------------------------------|------------|-------------------|
| Expanded uncertainty                                    | 1,76       | mg/m <sup>3</sup> |
| Required measurement quality as 95% confidence interval | 3,00       | mg/m <sup>3</sup> |
| <b>Confidence interval met</b>                          | <b>YES</b> |                   |
| Total response time                                     | 93         | seconds           |
| Required response time                                  | 450        | seconds           |
| <b>Response time met</b>                                | <b>YES</b> |                   |

|                   |                              |
|-------------------|------------------------------|
| <b>Conclusion</b> | <b>The AMS is ACCEPTABLE</b> |
|-------------------|------------------------------|

This report confirms that the product  
**AO2000-Uras14 CO**  
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.