

# PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

## ***LDS 6 Ammonia Analyser***

Manufactured by:

### **Siemens SAS**

*Division Production Sensors & Communication  
Usine de Haguenau  
1, Chemin de la Sandlach  
67506 Haguenau Cedex  
France*

Has been assessed by Sira Certification Service  
And for the conditions stated on this certificate complies with:

**MCERTS Performance Standards for Continuous Emission  
Monitoring Systems, Version 3.4 dated July 2012  
EN15267-3:2007,  
& QAL 1 as defined in EN 14181: 2004**

Certification Ranges\*:

|                  |                            |                                 |
|------------------|----------------------------|---------------------------------|
| NH <sub>3</sub>  | 0 to 20 mg/m <sup>3</sup>  | (0 to 25 mg/m <sup>3</sup> *m)  |
|                  | 0 to 76 mg/m <sup>3</sup>  | (0 to 95 mg/m <sup>3</sup> *m)  |
|                  | 0 to 380 mg/m <sup>3</sup> | (0 to 475 mg/m <sup>3</sup> *m) |
| H <sub>2</sub> O | 0 to 30 %vol.              | (0 to 37.5 %vol.*m)             |
|                  | 0 to 40 %vol.              | (0 to 50 %vol.*m)               |

\*Valid for a path length of 1.25m or higher

Project No. : 16A26521  
Certificate No : Sira MC 060088/04  
Initial Certification : 29 November 2006  
This Certificate Issued : 03 October 2013  
Renewal Date : 28 November 2016

R Cooper | Eng MInst MC  
Technical Director

MCERTS is operated on behalf of the Environment Agency by

## **Sira Certification Service**

12 Acorn Industrial Park, Crayford Road, Crayford  
Dartford, Kent, UK DA1 4AL  
Tel: +44 (0)1322 520500 Fax: +44 (0)1322 520501



*This certificate may only be reproduced in its entirety and without change  
Registered Office: Rake Lane, Eccleston, Chester, UK CH4 9JN*

*To authenticate the validity of this certificate please visit [www.siracertification.com/mcerts](http://www.siracertification.com/mcerts)*

## Approved Site Application

*Any potential user should ensure, in consultation with the manufacturer, that the monitoring system is suitable for the intended application. For general guidance on monitoring techniques refer to the Environment Agency Monitoring Technical Guidance Notes available at [www.mcerts.net](http://www.mcerts.net)*

On the basis of the assessment and the ranges required for compliance with EU Directives this instrument is considered suitable for use on waste incineration and large coal-fired combustion plant applications. This CEM has been proven suitable for its measuring task (parameter and composition of the flue gas) by use of the QAL 1 procedure specified in EN14181, for LCPD and WID applications for the ranges specified. The lowest certified range for each determinand shall not be more than 1.5X the daily average emission limit value (ELV) for WID applications, and not more than 2.5X the ELV for LCPD and other types of application.

## Basis of Certification

This certification is based on the following Test Report(s) and on Sira's assessment and ongoing surveillance of the product and the manufacturing process:

|                                |   |
|--------------------------------|---|
| TÜV SÜD Industrie Service GmbH | Report Number 751376 dated January 2005     |
| TÜV SÜD Industrie Service GmbH | Report Number 819683 dated February 2008    |
| TÜV SÜD Industrie Service GmbH | Report Number 840754-E2 dated January 2009  |
| TÜV SÜD Industrie Service GmbH | Report Number 1701628.10 dated October 2012 |

## Product Certified

The LDS 6 Ammonia measuring system consists of the following parts:

- Central Unit: 7MB6121-0CT00-0xxx (NH<sub>3</sub>)  
7MB6121-0DT00-0xxx (NH<sub>3</sub> & H<sub>2</sub>O)  
7MB6121-0MT00-0xxx (H<sub>2</sub>O)
- Sensor CD 6: 7MB6122-0Wxxx-xxxx
- Hybrid cable and sensor connecting cable (Loop cable)
- Calibration Verification Kit (RC3009)

This certificate applies to all instruments fitted with software version R19 onwards (serial number N1V1100070 onwards).

For compliance with EN 15267-3, software version R25 onwards.

## Certified Performance

The instrument was evaluated for use under the following conditions:

|                            |              |                |
|----------------------------|--------------|----------------|
| Ambient Temperature Range: | Sensor unit  | -20°C to +50°C |
|                            | Control unit | +5°C to +40°C  |
| Instrument IP rating:      | Sensor unit  | IP65           |
|                            | Control unit | IP20 (Note)    |

Note: The protection provided by the central unit is only IP 20. If the operating conditions require a higher class the central unit shall be incorporated into an analysis cabinet with the relevant protection class (IP 40 for EN 15267-3).

Results are expressed as % of the certification range NH<sub>3</sub> 0 to 20 mg/m<sup>3</sup> or H<sub>2</sub>O 0 to 30 %<sup>vol.</sup>, unless otherwise stated.

| Test  | Results expressed as % of the certification range |       |      |      | Other results | MCERTS specification |
|---|---|-------|------|------|---------------|----------------------|
|   | <0.5  | <1    | <2   | <5   |               |                      |
| Response time                                       |   |       |      |      |               |                      |
| NH <sub>3</sub>                                     |   |       |      |      | <3 secs       | <200s                |
| H <sub>2</sub> O                                    |   |       |      |      | < 3 secs      | <200s                |
| Repeatability standard deviation at zero point      |   |       |      |      |               |                      |
| NH <sub>3</sub>                                     |   |       | 1.1  |      |               | <2.0%                |
| H <sub>2</sub> O                                    | 0.3   |       |      |      |               | <2.0%                |
| Repeatability standard deviation at reference point |   |       |      |      |               |                      |
| NH <sub>3</sub>                                     |   | 0.9   |      |      |               | <2.0%                |
| H <sub>2</sub> O                                    |   | 0.5   |      |      |               | <2.0%                |
| Lack-of-fit   |   |       |      |      |               |                      |
| NH <sub>3</sub> (0 to 20 mg/m <sup>3</sup> )        |   | 0.98  |      |      |               | <2.0%                |
| NH <sub>3</sub> (0 to 100 ppm)                      |   | 0.56  |      |      |               | <2.0%                |
| NH <sub>3</sub> (0 to 500 ppm)                      |   |       | 1.09 |      |               | <2.0%                |
| H <sub>2</sub> O (0 to 30%vol.)                     |   | -0.71 |      |      |               | <2.0%                |
| H <sub>2</sub> O (0 to 40%vol.)                     |   | 0.57  |      |      |               | <2.0%                |
| Influence of ambient temperature zero point         |   |       |      |      |               |                      |
| Control unit (+5 to +40°C)                          |   |       |      |      |               |                      |
| NH <sub>3</sub>                                     |   | -0.7  |      |      |               | <5.0%                |
| H <sub>2</sub> O                                    |   | -0.5  |      |      |               | <5.0%                |
| Sensor unit (-20 to +50°C)                          |   |       |      |      |               |                      |
| NH <sub>3</sub>                                     |   |       |      | -3.7 |               | <5.0%                |
| H <sub>2</sub> O                                    |   |       | -1.0 |      |               | <5.0%                |

Certificate No :                 Sira MC060088/04  
This Certificate issued :         03 October 2013

*This certificate may only be reproduced in its entirety and without change  
To authenticate the validity of this certificate please visit [www.siracertification.com/mcerts](http://www.siracertification.com/mcerts)*

| Test   | Results expressed as % of the certification range |      |      |      | Other results   | MCERTS specification |
|--|---|------|------|------|---|----------------------|
|  | <0.5  | <1   | <2   | <5   |   |                      |
| Influence of ambient temperature reference point   |   |      |      |      |   |                      |
| Control unit (+5 to +40°C)   |   |      |      |      |   |                      |
| NH <sub>3</sub>  |   |      | -1.2 |      |   | <5.0%                |
| H <sub>2</sub> O   |   |      | -1.0 |      |   | <5.0%                |
| Sensor unit (-20 to +50°C)   |   |      |      |      |   |                      |
| NH <sub>3</sub>  |   |      |      | -3.0 |   | <5.0%                |
| H <sub>2</sub> O   |   |      | -1.0 |      |   | <5.0%                |
| Influence of sample gas pressure (94.7 to 102.2 kPa)   |   |      |      |      |   |                      |
| NH <sub>3</sub>  |   |      | -1.2 |      |   | <2.0%                |
| H <sub>2</sub> O   |   | -0.9 |      |      |   | <2.0%                |
| Influence of voltage variations (190 to 253V)  |   |      |      |      |   | <2.0%                |
| NH <sub>3</sub>  |   | 0.7  |      |      |   | <2.0%                |
| H <sub>2</sub> O   |   |      | -1.0 |      |   | <2.0%                |
| Influence of vibration (10 to 60Hz (±0.3mm), 60 to 160Hz at 2g)  |   |      |      |      |   | To be reported       |
| NH <sub>3</sub>  |   | -0.8 |      |      |   | <2.0%                |
| H <sub>2</sub> O   |   | 0.7  |      |      |   | <2.0%                |
| Cross-sensitivity at zero with interferents: 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> , SO <sub>2</sub> , HCl      |   |      |      |      | Note 1  |                      |
| NH <sub>3</sub> (0 to 20 mg/m <sup>3</sup> )   |   |      |      | 2.0  |   | <4.0%                |
| H <sub>2</sub> O (0 to 30% <sup>vol.</sup> )   | <0.5  |      |      |      |   | <4.0%                |
| Cross-sensitivity at reference with interferents: 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> , SO <sub>2</sub> , HCl |   |      |      |      | Note 1  |                      |
| NH <sub>3</sub> (0 to 20 mg/m <sup>3</sup> )   |   |      |      | -3.6 |   | <4.0%                |
| H <sub>2</sub> O (0 to 30% <sup>vol.</sup> )   |   |      | 1.2  |      |   | <4.0%                |
| Measurement uncertainty  |   |      |      |      | Guidance - at least 25% below max permissible uncertainty |                      |
| NH <sub>3</sub>  |   |      |      |      | 19.7%   | <40% (30%)           |
| H <sub>2</sub> O   |   |      |      |      | 8.7%  | <30% (22.5%)         |

Certificate No : Sira MC060088/04  
This Certificate issued : 03 October 2013

*This certificate may only be reproduced in its entirety and without change  
To authenticate the validity of this certificate please visit [www.siracertification.com/mcerts](http://www.siracertification.com/mcerts)*

| Test  | Results expressed as % of the certification range  |    |       |       | Other results    | MCERTS specification   |
|---|--|----|-------|-------|------------------|--|
|   | <0.5   | <1 | <2    | <5    |                  |  |
| Calibration function (field)                        |  |    |       |       |                  |  |
| NH <sub>3</sub>                                     |  |    |       |       | 0.95-0.99        | >0.90  |
| H <sub>2</sub> O                                    |  |    |       |       | 0.98-0.99        | >0.90  |
| Response time (field)                               |  |    |       |       |                  |  |
| NH <sub>3</sub>                                     |  |    |       |       | < 3 secs         | <200s  |
| H <sub>2</sub> O                                    |  |    |       |       | < 3 secs         | <200s  |
| Lack of fit (field)                                 |  |    |       |       |                  |  |
| NH <sub>3</sub>                                     |  |    | -1.98 |       |                  | <2.0%  |
| H <sub>2</sub> O                                    |  |    | -0.72 |       |                  | <2.0%  |
| Maintenance interval                                |  |    |       |       | Note 2<br>Note 3 | >8 days  |
| Zero and Span drift requirement                     | <p>The AMS performs a permanent check on zero and reference point. The consistency of the reference value is monitored by comparing it to the original value and is confirmed through proof of drift behaviour for the entire test period (without re-alignment of zero and reference point).</p> <p>Deviations in zero point and reference point checks are continuously monitored and when they exceed the defined limits will register with a disruption report to the status contact. When they exceed the system internal limits the system must be checked or re-adjusted.</p> |    |       |       |                  | <p>Clause 6.13 &amp; 10.13</p> <p>Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.</p> |
| Change in zero point over maintenance interval      |  |    |       |       |                  |  |
| NH <sub>3</sub>                                     |  |    |       | -2.5  |                  | <3.0%  |
| H <sub>2</sub> O                                    |  |    | 1.2   |       |                  | <3.0%  |
| Change in reference point over maintenance interval |  |    |       |       |                  |  |
| NH <sub>3</sub>                                     |  |    |       | -2.23 |                  | <3.0%  |
| H <sub>2</sub> O                                    |  |    |       | -2.93 |                  | <3.0%  |
| Availability  |  |    |       |       | 96.2%            | >95%   |
| Reproducibility                                     |  |    |       |       |                  |  |
| NH <sub>3</sub>                                     |  |    |       | 3.2   |                  | <3.3%  |
| H <sub>2</sub> O                                    |  |    |       | 1.3   |                  | <3.3%  |

Certificate No : Sira MC060088/04  
This Certificate issued : 03 October 2013

*This certificate may only be reproduced in its entirety and without change  
To authenticate the validity of this certificate please visit [www.siracertification.com/mcerts](http://www.siracertification.com/mcerts)*

Note 1: Due to the chemical reaction of the cross-sensitivity component  $\text{NH}_3$  the presentation of cross-sensitivity at span point was not possible.

Note 2: There is an interval of 2 weeks for a check of alignment and contamination of optical surfaces. Zero and span point drift for  $\text{NH}_3$  and  $\text{H}_2\text{O}$  should be checked every 6 months using Calibration Verification Kit.

Note 3: General notes on use of LDS  $\text{NH}_3$  analyser:

- The compensation parameters should be set on the system to compensate for  $\text{O}_2$  and  $\text{CO}_2$  cross-sensitivity on the measurement component  $\text{NH}_3$ .
- The dynamic moisture correction facility should be deactivated when the calibration kit RC 3009 is used.
- The AMS must be operated with instrument air purging.
- The AMS shall be provided with the value of the temperature and pressure of the measured gas either as an analogue signal 4-20 mA or set as a fixed value if there are very stable conditions.
- The alarm threshold for relative transmission, when interference is reported due to contamination or re-alignment of the sensor heads, should be set at least at 85 % (transmission disturbance can suggest re-adjustment).

Certificate No : Sira MC060088/04  
This Certificate issued : 03 October 2013

*This certificate may only be reproduced in its entirety and without change  
To authenticate the validity of this certificate please visit [www.siracertification.com/mcerts](http://www.siracertification.com/mcerts)*

## Description

The LDS 6 is a system for on-line in-situ analysis providing continuous presentation of real-time measurements. The gas concentration is measured using single line absorption spectroscopy. Cross sensitivities to other gases are eliminated in the measurements due to the frequency purity of the laser enabling selective detection of individual absorption lines.

The LDS 6 consists of a sensor pair (measuring heads) and a central unit interconnected using optical fibre cables. The light source is a diode laser with a wavelength that can be tuned within a narrow spectral range. An optical fibre guides the light from the central unit to the sensor, where it is directed into the measuring section. The laser beam passes through the gas in the measuring section and is partially absorbed there. The light attenuated in this way is detected by the receiver and is returned to the central unit. The variation in the intensity of the laser light in the vicinity of the absorption line is measured, and the concentration of the gas being measured is calculated using the second harmonic of the detected signal. The LDS 6 can measure at three locations simultaneously. Each measurement point needs a receiver board in the central unit as well as a sensor with cabling. The gas concentration is indicated on the numerical display and given as an analogue 4-20 mA output.

## General Notes

1. This certificate is based upon the equipment tested. The Manufacturer is responsible for ensuring that on-going production complies with the standard(s) and performance criteria defined in this Certificate. 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 system shall be subject to regular surveillance according to 'Regulations Applicable to the Holders of Sira Certificates'. The design of the product certified is defined in the Sira Design Schedule for certificate No. Sira MC060088/03.
2. If certified product is found not to comply, Sira Certification Service should be notified immediately at the address shown on this certificate.
3. The Certification Marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of Sira Certificates'.
4. This document remains the property of Sira and shall be returned when requested by the company.