

CERTIFICATE

on Product Conformity (QAL1)

Number of Certificate: 0000001014_01

Certified AMS: 4500 MKIII for dust

Manufacturer: Land Instruments International Ltd.
Stubley Lane, Dronfield
Derbyshire
S18 1DJ, England

Test Institute: TÜV Rheinland Energie und Umwelt GmbH

**This is to certify that the AMS has been tested
and found to comply with:**

**EN 15267-1: 2009, EN 15267-2: 2009, EN 15267-3: 2008
and EN 14181: 2004**

Certification is awarded in respect of the conditions stated in this certificate
(see also the following pages).

The present certificate replaces Certificate No. 0000001014 dated 19 August 2011



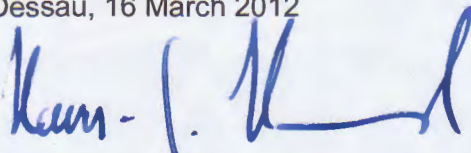
- EN 15267-3 tested
- QAL1 certified
- TUV approved
- Annual inspection

Publication in the German Federal Gazette
(BAnz.) of 02 March 2012

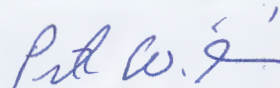
The certificate is valid until:
28 July 2016

Umweltbundesamt
Dessau, 16 March 2012

TÜV Rheinland Energie und Umwelt GmbH
Köln, 15 March 2012



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Accreditation according to EN ISO/IEC 17025 and certified according to ISO 9001:2008.

Test report:	936/21216966/A of 15 September 2011
First certification:	29 July 2011
Validity ends:	28 July 2016
Publication:	BAnz. 02 March 2012, No. 36, p. 920, chapter I, No. 1.1

Approved application

The tested AMS is suitable for use at combustion plants according to EC directive 2001-80-EC, at waste incineration plants according to EC directive 2000-76-EC and other plants requiring official approval. The tested ranges have been chosen with respect to the wide application range of the AMS.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and an eight months field test at a municipal waste incinerator.

The AMS is approved for an ambient temperature range of -20 °C to +50 °C.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the installation at which it will be installed.

Basis of the certification

This certification is based on:

- test report 936/21213182/A dated 31 March 2011 of TÜV Rheinland Energie und Umwelt GmbH
- test report 936/21216966/A dated 15 September 2011 of TÜV Rheinland Energie und Umwelt GmbH
- suitability announced by the German Environmental Agency (UBA) as the relevant body
- the ongoing surveillance of the product and the manufacturing process
- publication in the German Federal Gazette (BAnz. 02 March 2012, No. 36, p. 920, chapter I, No. 1.1 Announcement by UBA from 23 February 2012)

AMS name:

4500 MKIII for dust

Manufacturer:

Land Instruments International Ltd., Dronfield, England

Field of application:

For measurements at plants requiring official approval (i. e. plants in 2000-76-EC, waste incineration directive and 2001-80-EC large combustion plants directive)

Measuring ranges during the suitability test:

Component	Certification range	Supplementary measurement ranges			Unit
Dust	0 – 0,2	0 – 0,1	0 – 0,4	0 – 1,2	Ext.

0 – 0,2 Ext. \triangleq 15 mg/m³ dust at 5 m measurement path length

Software version:

Control Software Versions: 01.03.01,
HI Software Version: 01.02.01

Restriction:

The measurement device is only suitable when an undercut of the dew point can be excluded.

Notes:

1. The dust concentration is measured in the wet flue gas under operating conditions.
2. A three month period has been specified as maintenance interval.
3. By the measurement path length of 5 m and a measurement range of 15 mg/m³ evaluated during the calibration a product of 75 mg m/m³ results for the field test site.
4. The requirement of the type approval in accordance with EN 15267-3 for the correlation coefficient R² of the calibration function was not fulfilled.
5. Supplementary testing (extension of the maintenance interval) on the announcement of the Federal Environment Agency on 15 July 2011 (BAnz. p. 2725, chapter I, No. 1.1)

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Köln
Report No.: 936/21216966/A dated 15 September 2011

Certified product

This certificate applies to automated measurement systems confirming to the following description:

The measurement device Land 4500 MKIII was developed for the determination of the dust concentration at emitting plants. The underlying principle is the measurement of the optical transmission.

The Land Model 4500 MKIII is a further development from the Land Model 4500 MKII+. The main light source uses three green LEDs in a special configuration (patent pending) to ensure homogeneity over the entire transmitted light beam. The light source is modulated at a frequency of 1 kHz, to reduce electrical noise and eliminate errors due to ambient light. A second light source, the (patented) "Flood LED" is used to reduce the effect of temperature drift in the detectors to an almost immeasurable low level.

Electronic modulation eliminates the need for a mechanical chopper and so the only moving parts are the motors used in the calibration system. These motors have a very low duty cycle and are very reliable.

The Land Instruments International Model 4500 MKIII Continuous Opacity Monitoring System (COMS) measures opacity by shining a light beam through flue gases. An internal microprocessor calculates dust density and other parameters. The instrument comprises the following parts: The Transceiver which contains all of the optical and electro-optic components; the Retro-Reflector containing a glass reflector and the air purge system.

The air purge system is available in several forms depending upon individual site requirements. Single and dual electric blowers are available, as are compressed-air driven devices. Continuous purge air supply is essential to prevent dust and corrosive gases from affecting the optical system. Automatic fail-safe shutters can also be fitted for temporary protection in the event of a purge air failure.

The analyser is basically composed of the following components:

Transceiver:	Containing all of the major electronic and electro-optic components.
Retro-Reflector:	Containing a corner cube reflector.
Air Purge System:	A continuous supply of purge air is essential to prevent dust and corrosive gases from affecting the optical system. Single and dual electric blowers or compressed-air driven devices are available to suit individual site requirements. Automatic fail-safe shutters can also be fitted for temporary protection in the event of a purge air failure.

Measurement path length and concentration:

0 – 0,2 Ext. \triangleq 15 mg/m³ dust at 5 m measurement path length

General notes

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. 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 systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energie und Umwelt GmbH must be notified at the address given on page 1.

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate. This can be applied to the product or used in publicity material for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energie und Umwelt GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the validity of the certificate and on requests of the TÜV Rheinland Energie und Umwelt GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and the validity is also accessible on the internet Address: **qal1.de**.

Certification of 4500 MKIII for dust is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Initial certification according to EN 15267:

Certificate No. 0000001014: 19 August 2011

Validity of the certificate until: 28 July 2016

Test report: 936/21213182/A of 31 March 2011,
TÜV Rheinland Energie und Umwelt GmbH, Köln

Publication: BAnz. 29 July 2011, No. 113, p. 2725, Chapter I No. 1.1:
Announcement by UBA from 15 July 2011

Supplementary testing according to EN 15267:

Certificate No. 0000001014_01:16 March 2012

Validity of certificate until: 28 July 2016

Test report: 936/21216966/A of 15 September 2011,
TÜV Rheinland Energie und Umwelt GmbH, Köln

Publication: BAnz. 02 March 2012, No. 36, p. 920, chapter I, No. 1.1:
Announcement by UBA from 23 February 2012

Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system

Manufacturer	Land Instruments International Ltd.
Name of measuring system	4500 MKIII
Serial number of the candidates	150854 83 / 154891 91
Measuring principle	Transmission

Test report

Test laboratory	936/21213182/A / 936/21213182/B
Date of report	TÜV Rheinland Energie und Umwelt GmbH
	31.03.2011 / 15.09.2011

Measured component

	Dust
Certification range	0 - 15 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

	u		u ²
Standard deviation from paired measurements under field conditions *	u _D 0.110	mg/m ³	0.012 (mg/m ³) ²
Lack of fit	u _{lof} -0.081	mg/m ³	0.007 (mg/m ³) ²
Zero drift from field test	u _{d,z} 0.095	mg/m ³	0.009 (mg/m ³) ²
Span drift from field test	u _{d,s} -0.170	mg/m ³	0.029 (mg/m ³) ²
Influence of ambient temperature at span	u _t 0.030	mg/m ³	0.001 (mg/m ³) ²
Influence of supply voltage	u _v 0.023	mg/m ³	0.001 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u _{rm} 0.121	mg/m ³	0.015 (mg/m ³) ²
Excursion of measurement beam	u _{mb} 0.173	mg/m ³	0.030 (mg/m ³) ²

* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_c)

$$u_c = \sqrt{\sum (u_{\max, j})^2} \quad 0.32 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 0.63 \text{ mg/m}^3$$

Relative total expanded uncertainty

Requirement of 2000/76/EC and 2001/80/EC

Requirement of EN 15267-3

U in % of the ELV 10 mg/m³ **6.3**

U in % of the ELV 10 mg/m³ **30.0**

U in % of the ELV 10 mg/m³ 22.5