Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000035006_04

AMS designation:	V-CEM5100 for waste gas velocity
Manufacturer:	CODEL International Ltd. Station Road DE45 1GE Bakewell / Derbyshire United Kingdom
Test Laboratory:	TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and found to comply with the standards EN 15267-1 (2009), EN 15267-2 (2009), EN 15267-3 (2007) and EN 14181 (2004).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 7 pages).
The present certificate replaces certificate 0000035006_03 of 28 February 2017.

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance

www.tuv.com
ID 0000035006

Publication in the German Federal Gazette (BAnz) of 05 March 2013

German Federal Environment Agency
Dessau, 16 February 2022

Dr. Marcel Langner
Head of Section II 4.1

This certificate will expire on:
01 March 2027

TÜV Rheinland Energy GmbH
Cologne, 15 February 2022

ppa. Dr. Peter Wilbring

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TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

Test institute accredited to EN ISO/IEC 17025 by DAkkS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to certificate D-PL-11120-02-00.

Test report:	936/21216334/D of 17 September 2012
Initial certification:	16 March 2012
Expiry date:	01 March 2027
Certificate	Renewal (of previous certificate 0000035006_03 of 28 February 2017 valid until 01 March 2022)
Publication:	BAnz AT 05. March 2013 B10, chapter II number 2.1

Approved application
The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), chapter IV (17th BImSchV), 30th BImSchV, plants in compliance with TA Luft, plants according to the 27th BImSchV and other plants requiring official approval. The measured ranges have been selected so as to ensure as broad a field of application as possible.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a 12-month field test at a power plant.

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

The notification of suitability of the AMS, performance testing and the uncertainty calculation have been effected on the basis of the regulations applicable at the time of testing. As changes in legal provisions are possible, any potential user should ensure that this AMS is suitable for monitoring the velocities relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the intended purpose.

Basis of the certification
This certification is based on:

- Test report 936/21216334/D of 17 September 2012 by TÜV Rheinland Energie und Umwelt GmbH
- Suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process

Publication in the German Federal Gazette: BAnz AT 05.03.2013 B10, chapter II number 2.1, UBA announcement dated 12 February 2013:

AMS designation:
V-CEM5100 for velocity

Manufacturer:
CODEL International Ltd., Bakewell, Derbyshire, United Kingdom

Field of application:
For plants requiring official approval and for plants according to the 27th BImSchV

Measuring ranges during performance testing:

Component	Certification range	Unit
Velocity	3 – 50	m/s

Software version:
507.105B

Restrictions:
The lower limit of the speed measurement range is 3 m/s.

Notes:

1. The maintenance interval is six months.
2. The unit can be used under the following operating conditions:
   Moisture content > 2 %, temperature > 40 °C, duct diameter > 0.5 m.
3. Supplementary testing (extension of the maintenance interval) as regards Federal Environment Agency (UBA) notice of 06 July 2012 (BAnz AT 20.07.2012 B11, chapter II number 2.1).

Test Report:
TÜV Rheinland Energy GmbH, Cologne
Report no.: 936/21216334/D of 17 September 2012

Publication in the German Federal Gazette: BAnz AT 23.07.2013 B4, chapter V
1st notification, UBA announcement dated 3 July 2013:

1 Notification as regards Federal Environment Agency (UBA) notice of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.1)

The latest software version of the V-CEM5100 measuring system for velocity manufactured by Codel International Ltd. is: 507,105 C.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 5 March 2013

Publication in the German Federal Gazette: BAnz AT 01.04.2014 B12, chapter VI
8th notification, UBA announcement dated 27 February 2014:

8 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.1) and of 3 July 2013 (BAnz AT 23.07.2013 B4, chapter V 1st notification)

The V-CEM5100 measuring system for velocity manufactured Codel International Ltd. has a new design for the keypad of the display unit (DDU).

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 30 September 2013

Publication in the German Federal Gazette: BAnz AT 05.08.2014 B11, chapter V
5th notification, UBA announcement dated 17 July 2014:

5 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.1) and of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter VI 8th notification)

The V-CEM5100 AMS for velocity manufactured by
Codel International Ltd. can be equipped with an RS485 interface.

The software versions for the measuring system are:

507-105C (Display unit DDU)
507-031A (SPU signal processing unit, Master)
507-030A (SPU signal processing unit, Slave)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 28 March 2014

Certified product
This certification applies to automated measurement systems conforming to the following description:

The CODEL Model V-CEM5100 measuring system uses the principle of infrared cross correlation to determine the waste gas velocity in flowing gases.
Turbulence in the flow causes a series of vortices that are carried with the flow. The infrared radiation of the hot waste gases is characterized by a distinctive "flickering" caused by these gas vortices. Two infrared sensors mounted on the duct wall at a defined distance from each other along the flow direction detect the same characteristic infrared signal pattern and calculate the transit time between the two sensors to determine the exhaust gas velocity.

The V-CEM5100 AMS for measuring waste gas velocity consists of the following components:

- Two sensor units "Transducer units" consisting of a broadband infrared detector, a lens which focuses the radiation onto the detector and a preamplifier. The components are installed in an epoxy-coated aluminium housing.
- Power supply unit (PSU)
- Signal Processor Unit (SPU) for signal processing, for transmitting diagnostic values and for adjustment
- Display unit "Data Display Unit (DDU)" for showing measured values and diagnostic values in the display and for editing input values. In addition, the analogue and status signals of the AMS are provided via the display unit. The DDU is connected to the SPU via a cable with a max. length of 1 km

General remarks
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 manufacturing process for 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 Energy 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 document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. Upon revocation of the publication the certificate loses its validity. After the expiration of the certificate and on request of TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must no longer be used.

The relevant version of this certificate and its expiration date are also accessible on the internet at **qal1.de**.

Document history

Certification of the V-CEM5100 measuring system is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

Initial certification according to EN 15267

Certificate no. 0000035006_00: 16 March 2012
Expiry date of the certificate: 01 March 2017
Test report: 936/21216334/A of 14 October 2011
TÜV Rheinland Energie und Umwelt GmbH
Publication: Banz. 02 March 2012, no. 36, p. 920, chapter II number 2.2
UBA announcement dated 23 February 2012

Supplementary testing according to EN 15267

Certificate no. 0000035006_01: 20 August 2012
Expiry date of the certificate: 01 March 2017
Test report: 936/21216334/C of 20 March 2012
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 20.07.2012 B11, chapter II number 2.1
UBA announcement dated 06 July 2012

Certificate no. 0000035006_02: 22 March 2013
Expiry date of the certificate: 01 March 2017
Test report: 936/21216334/D of 17 September 2012
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 05.03.2013 B10, chapter II number 2.1
UBA announcement dated 12 February 2013

Notifications in accordance with EN 15267

Statement issued by TÜV Rheinland Energy GmbH dated 5 March 2013
Publication: BAnz AT 23.07.2013 B4, chapter V notification 1
UBA announcement dated 3 July 2013
(Software updates)

Statement issued by TÜV Rheinland Energy GmbH dated 30 September 2013
Publication: BAnz AT 01.04.2014 B12, chapter VI notification 8
UBA announcement dated 27 February 2014
(Design changes)

Statement issued by TÜV Rheinland Energy GmbH dated 28 March 2014
Publication: BAnz AT 05.08.2014 B11, chapter V notification 5
UBA announcement dated 17 July 2014
(Design and software changes)

Renewal of the certificate

Certificate no. 0000035006_03: 28 February 2017
Expiry date of the certificate: 01 March 2022

Certificate no. 0000035007_02: 16 February 2022
Expiry date of the certificate: 01 March 2027

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

Measuring system					
Manufacturer			Codel International Ltd.		
Name of measuring system			V-CEM5100		
Serial number of the candidates			M 5100-0314 / M 5100-0315		
Measuring principle			cross correlation		
Test report			936/21216334/D		
Test laboratory			TÜV Rheinland		
Date of report			2012-09-17		
Measured component			Velocity		
Certification range			3 - 50	m/s	

Calculation of the combined standard uncertainty

Tested parameter		u		u²	
Standard deviation from paired measurements under field conditions *	u_D	0.507	m/s	0.257	(m/s)²
Lack of fit	u_{lof}	0.115	m/s	0.013	(m/s)²
Zero drift from field test	$u_{d,z}$	0.106	m/s	0.011	(m/s)²
Span drift from field test	$u_{d,s}$	-0.199	m/s	0.040	(m/s)²
Influence of ambient temperature at span	u_t	0.306	m/s	0.094	(m/s)²
Influence of supply voltage	u_v	0.240	m/s	0.058	(m/s)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.404	m/s	0.163	(m/s)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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.80	m/s
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.56	m/s

Relative total expanded uncertainty	**U in % of the range 50 m/s**	**3.1**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the range 50 m/s**	**10.0 ****
Requirement of EN 15267-3	U in % of the range 50 m/s	7.5

** For this component no requirements in the EC-directives 2001/80/EG und 2000/76/EG are given.
A value of 10.0 % was used for this.