

# CERTIFICATE

## on Product Conformity (QAL1)

Certificate No.: 0000035006\_02

**Certified AMS:** V-CEM5100 for velocity

**Manufacturer:** CODEL International Ltd.  
Station Road, Bakewell  
DE45 1GE GB Derbyshire  
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: 2007  
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. 0000035006\_01 of 20 August 2012



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

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

German Federal Environment Agency  
Dessau, 22 March 2013

i. A. Dr. Marcel Langner

This certificate will expire on:  
01 March 2017

TÜV Rheinland Energie und Umwelt GmbH  
Cologne, 21 March 2013

ppa. Dr. Peter Wilbring

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

<b>Test report:</b>	936/21216334/D of 17 September 2012
<b>Initial certification:</b>	02 March 2012
<b>Expiry date:</b>	01 March 2017
<b>Publication:</b>	BAnz AT 05 March 2013 B10, chapter II, No. 2.1

#### **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 measured ranges have been selected considering 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 a twelvemonth field test at a coal fired power plant.

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 936/21216334/D of 17 September 2012 of 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 March 2013 B10, chapter II, No. 2.1



**AMS designation:**

V-CEM5100 for velocity

**Manufacturer:**

CODEL International Ltd., Bakewell, Derbyshire, United Kingdom

**Field of application:**

Measurement at plants requiring official approval as well as plants within the scope of 2000/76/EC (waste incineration directive) and 2001/80/EC (large combustion plants directive)

**Measuring ranges during the suitability test:**

Component	Certification range	Unit
velocity	3 - 50	m/s

**Software version:**

507.105B

**Restriction:**

The lower limit of the velocity measuring range is 3 m/s.

**Notes:**

1. The maintenance interval is six months.
2. The AMS may be used under the following peripheral conditions:  
moisture content > 2 %, temperature > 40 °C, duct diameter > 0.5 m.
3. Supplementary testing (extension of the maintenance interval) as regards Federal Environmental Agency notice of 6 July 2012 (Federal Gazette (BAnz.) AT 20 July 2012 B11, chapter II no. 2.1).

**Test report:**

TÜV Rheinland Energie und Umwelt GmbH, Cologne  
Report No.: 936/21216334/D of 17 September 2012

### **Certified product**

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

Flow monitoring system CODEL Model V-CEM5100 is using a cross correlation principle to determine the velocity in gas flows.

Series of vortexes caused by turbulences in the gas flow are transported by the gas flow. The infrared radiation of hot waste gas is characterized by special flickering caused by the gas vortexes. These characteristic infrared signals are detected by two infrared detectors mounted at the duct wall in flow direction with a defined distance to determine the time delay between the two sensors to calculate the gas velocity.

The flow monitor V-CEM5100 consists of the following parts:

- Two transducer units consisting of a broadband infrared detector, a lens to focus the radiation on to the sensor and a preamplifier. These parts are mounted inside a sealed epoxy-coated aluminium housing.
- a Power supply unit (PSU)
- a Signal processor unit (SPU) for signal processing, for submission of diagnostic data and for adjustment
- A Data display unit (DDU) for the presentation of measuring results and diagnostic values in the display and for editing of input values. Also the analogue output values and the digital status signals of the flow monitor are transmitted by the DDU. DDU is connected with the SPU via wire of max. 1 km length.
- the instrument software version 507.105B

### **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 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 its expiration is also accessible on the internet: [qal1.de](http://qal1.de).

Certification of V-CEM5100 for velocity 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. 0000035006: 16 March 2012  
Expiry date of the certificate: 01 March 2017  
Prüfbericht: 936/21216334/A of 14 October 2011  
TÜV Rheinland Energie und Umwelt GmbH, Cologne  
Publication: BAnz. 02 March 2012, No. 36, p. 920, chapter II, No. 2.2  
Announcement by UBA from 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, Cologne  
Publication: BAnz. AT 20 July 2012 B11, chapter II, No. 2.1  
Announcement by UBA from 06 July 2012

**Supplementary testing according to EN 15267:**

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, Cologne  
Publication: BAnz AT 05 March 2013 B10, chapter II, No. 2.1  
Announcement by UBA from 12 February 2013



**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**

Test laboratory	TÜV Rheinland
Date of report	2012-09-17

**Measured component**

Certification range	Velocity
	3 - 50 m/s

**Calculation of the combined standard uncertainty**

**Tested parameter**

	u	u <sup>2</sup>
Standard deviation from paired measurements under field conditions *	u <sub>D</sub> 0.507 m/s	0.257 (m/s) <sup>2</sup>
Lack of fit	u <sub>lof</sub> 0.115 m/s	0.013 (m/s) <sup>2</sup>
Zero drift from field test	u <sub>d,z</sub> 0.106 m/s	0.011 (m/s) <sup>2</sup>
Span drift from field test	u <sub>d,s</sub> -0.199 m/s	0.040 (m/s) <sup>2</sup>
Influence of ambient temperature at span	u <sub>t</sub> 0.306 m/s	0.094 (m/s) <sup>2</sup>
Influence of supply voltage	u <sub>v</sub> 0.240 m/s	0.058 (m/s) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	u <sub>rm</sub> 0.404 m/s	0.163 (m/s) <sup>2</sup>

\* The larger value is used :  
"Repeatability standard deviation at span" or  
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u <sub>c</sub> )	$u_c = \sqrt{\sum (u_{max, j})^2}$	0.80 m/s
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.56 m/s

**Relative total expanded uncertainty**

<b>Requirement of 2000/76/EC and 2001/80/EC</b>	<b>U in % of the range 50 m/s</b>	<b>3.1</b>
Requirement of EN 15267-3	U in % of the range 50 m/s	10.0**
	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.  
The chosen value is recommended by the certification body.