

CERTIFICATE OF CALIBRATION



CERTIFICATE NO. **CAL120909.**
DATE OF ISSUE **04/12/2009.**

No information on the uncertainty of measurement, required by 11.7 of IEC 61672-3:2006, of the adjustment data given in the instruction manual or obtained from the manufacturer of the Sound Level Meter, or the manufacturer of the Microphone, or the manufacturer of the multi-frequency Sound Calibrator was published in the instruction manual or made available by the manufacturer or supplier. The uncertainty of measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the Sound Level Meter may not conform to the requirements of IEC 61672-1:2002.

The total expanded measurement uncertainties associated with the calibration equipment and procedures is based on a standard uncertainty multiplied by a coverage factor $k=2$ to provide a confidence of approximately 95% in the results. The assessment of uncertainty has been carried out in accordance with national and international guidance upon the calculation of uncertainties in metrology.

Notes

1. The tests were conducted principally on the main channel, with a limited number of tests conducted for the sub channel. The Peak C sound level measurements were carried out for the sub channel as they are only available on this channel.
2. The instrument was running firmware version 1.009AN1002.



CERTIFICATE OF CALIBRATION

Certificate Number CAL120911
Date of Issue 07/12/2009
Customer TNEI Services Ltd

Description of Instrument

Sound Level Meter Rion NL-32 Sound Level Meter [Serial No. 00972335] with Rion UC-53A Microphone [Serial No.313224] and Rion NH-21 Preamplifier [Serial No.25120] Fitted with a WS-10 foam windshield.

The instrument successfully completed the Class 1 Periodic Tests of BS EN 61672.

Associated Calibrator B & K 4226 S/N 1445373.

Date of Calibration 07/12/2009.

Test Procedure ..\..\Calibration Results Sheets\Current Approved Results Sheets\NL-31 Master 61672-3 Approved Issue 6 (BK 1445373).xls

Test procedures in accordance with BS EN 61672-3:2006.
NOTE: Test 10.1 (Self Generated Noise with Microphone Installed) omitted.

Test Engineer [REDACTED]

APPROVED SIGNATORY [redacted]

[REDACTED] □ / [REDACTED] □

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ACOUSTICS NOISE AND VIBRATION LIMITED. REGISTERED IN ENGLAND No. 3549028. REGISTERED OFFICE AS ABOVE.

CERTIFICATE OF CALIBRATION



CERTIFICATE NO. CAL120911.
DATE OF ISSUE 07/12/2009.

Information relating to the operation and adjustment of the sound level meter were obtained from the data contained in the Rion Instruction Manual 32005 and associated Technical Notes 32042. Additional information relating to measurement uncertainties required by clause 11.3 has been provided by the Rion European Office and is available for inspection upon request.

Results

Tests on the Sound Level Meter were principally performed on the Main Channel. Limited tests were also performed using the Sub-Channel.

No Acoustic Calibrator was supplied with the instrument. When ANV Measurement Systems' B&K 4226 s/n 1445373 was initially applied the Sound Level Meter read 94.1dB (A). The meter was adjusted to read 93.9 dB (A) derived from the current calibration certificate for the calibrator at the indicated frequency of 1000 Hz.

The environmental conditions at the start and end of the calibration were within the specified range for calibration and were noted to be as follows:

Conditions	Measured Value at Start	Measured Value at End
Temperature	20.7 °C	22.4 °C
Relative Humidity	40.7 %	37.9 %
Atmospheric Pressure	99.0 kPa	98.9 kPa

The self generated noise levels of the instrument with the microphone replaced by the electrical input device were:

11.3 dB (A);
18.4 dB (C); and
23.6 dB (Z).

These measured levels were within the specified limits defined within the instruction manual.

The Sound Level Meter submitted for testing has successfully completed the Class 1 Periodic Tests of BS EN 61672, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about the conformance of the Sound Level Meter to the full requirements of BS EN 61672-1:2003 because evidence was not publically available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements of BS EN 61672-1:2003 and because the periodic tests of BS EN 61672-3:2006 only cover a limited subset of the specifications in BS EN 61672-1:2003.

The calibration incorporated the windshield corrections supplied by the manufacturer and the results are therefore applicable to the instrument with the microphone and pre-amplifier attached with the windscreen fitted.

CERTIFICATE OF CALIBRATION



CERTIFICATE NO. CAL120911.
DATE OF ISSUE 07/12/2009.

No information on the uncertainty of measurement, required by 11.7 of IEC 61672-3:2006, of the adjustment data given in the instruction manual or obtained from the manufacturer of the Sound Level Meter, or the manufacturer of the Microphone, or the manufacturer of the multi-frequency Sound Calibrator was published in the instruction manual or made available by the manufacturer or supplier. The uncertainty of measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the Sound Level Meter may not conform to the requirements of IEC 61672-1:2002.

The total expanded measurement uncertainties associated with the calibration equipment and procedures is based on a standard uncertainty multiplied by a coverage factor $k=2$ to provide a confidence of approximately 95% in the results. The assessment of uncertainty has been carried out in accordance with national and international guidance upon the calculation of uncertainties in metrology.

Notes

1. The tests were conducted principally on the main channel, with a limited number of tests conducted for the sub channel. The Peak C sound level measurements were carried out for the sub channel as they are only available on this channel.
2. The instrument was running firmware version 1.0009.



CERTIFICATE OF CALIBRATION

Certificate Number CAL120910

Date of Issue 04/12/2009

Customer TNEI Services Ltd

Description of Instrument

Sound Level Meter Rion NL-32 Sound Level Meter [Serial No. 00972336] with Rion UC-53A Microphone [Serial No.313226] and Rion NH-21 Preamplifier [Serial No.25121] Fitted with a WS-10 foam windshield.

The instrument successfully completed the Class 1 Periodic Tests of BS EN 61672.

Associated Calibrator B & K 4226 S/N 1445373.

Date of Calibration 04/12/2009.

Test Procedure ...\\Calibration Results Sheets\\Current Approved Results Sheets\\NL-31 Master 61672-3 Approved Issue 6 (BK 1445373).xls

Test procedures in accordance with BS EN 61672-3:2006.
NOTE: Test 10.1 (Self Generated Noise with Microphone Installed) omitted.

Test Engineer [REDACTED]

APPROVED SIGNATORY [redacted]

[REDACTED SIGNATURE]

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CERTIFICATE OF CALIBRATION



CERTIFICATE NO. **CAL120910.**
DATE OF ISSUE **04/12/2009.**

Information relating to the operation and adjustment of the sound level meter were obtained from the data contained in the Rion Instruction Manual 32005 and associated Technical Notes 32042. Additional information relating to measurement uncertainties required by clause 11.3 has been provided by the Rion European Office and is available for inspection upon request.

Results

Tests on the Sound Level Meter were principally performed on the Main Channel. Limited tests were also performed using the Sub-Channel.

No Acoustic Calibrator was supplied with the instrument. When ANV Measurement Systems' B&K 4226 s/n 1445373 was initially applied the Sound Level Meter read 94.1dB (A). The meter was adjusted to read 93.9 dB (A) derived from the current calibration certificate for the calibrator at the indicated frequency of 1000 Hz.

The environmental conditions at the start and end of the calibration were within the specified range for calibration and were noted to be as follows:

Conditions	Measured Value at Start	Measured Value at End
Temperature	22.7 °C	23.2 °C
Relative Humidity	35.6 %	36.4 %
Atmospheric Pressure	99.8 kPa	99.8 kPa

The self generated noise levels of the instrument with the microphone replaced by the electrical input device were:

11.2 dB (A);
18.6 dB (C); and
23.8 dB (Z).

These measured levels were within the specified limits defined within the instruction manual.

The Sound Level Meter submitted for testing has successfully completed the Class 1 Periodic Tests of BS EN 61672, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about the conformance of the Sound Level Meter to the full requirements of BS EN 61672-1:2003 because evidence was not publically available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements of BS EN 61672-1:2003 and because the periodic tests of BS EN 61672-3:2006 only cover a limited subset of the specifications in BS EN 61672-1:2003.

The calibration incorporated the windshield corrections supplied by the manufacturer and the results are therefore applicable to the instrument with the microphone and pre-amplifier attached with the windscreen fitted.

CERTIFICATE OF CALIBRATION



CERTIFICATE NO. **CAL120910.**
DATE OF ISSUE **04/12/2009.**

No information on the uncertainty of measurement, required by 11.7 of IEC 61672-3:2006, of the adjustment data given in the instruction manual or obtained from the manufacturer of the Sound Level Meter, or the manufacturer of the Microphone, or the manufacturer of the multi-frequency Sound Calibrator was published in the instruction manual or made available by the manufacturer or supplier. The uncertainty of measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the Sound Level Meter may not conform to the requirements of IEC 61672-1:2002.

The total expanded measurement uncertainties associated with the calibration equipment and procedures is based on a standard uncertainty multiplied by a coverage factor $k=2$ to provide a confidence of approximately 95% in the results. The assessment of uncertainty has been carried out in accordance with national and international guidance upon the calculation of uncertainties in metrology.

Notes

1. The tests were conducted principally on the main channel, with a limited number of tests conducted for the sub channel. The Peak C sound level measurements were carried out for the sub channel as they are only available on this channel.
2. The instrument was running firmware version 1.0009.



CERTIFICATE OF CALIBRATION

Certificate Number CAL120912

Date of Issue 07/12/2009

Customer TNEI Services Ltd

Description of Instrument

Sound Level Meter Rion NL-32 Sound Level Meter [Serial No. 00972337] with Rion UC-53A Microphone [Serial No.313228] and Rion NH-21 Preamplifier [Serial No.25122] Fitted with a WS-10 foam windshield.

The instrument successfully completed the Class 1 Periodic Tests of BS EN 61672.

Associated Calibrator B & K 4226 S/N 1445373.

Date of Calibration 07/12/2009.

Test Procedure ..\..\Calibration Results Sheets\Current Approved Results Sheets\NL-31 Master 61672-3 Approved Issue 6 (BK 1445373).xls

Test procedures in accordance with BS EN 61672-3:2006.
NOTE: Test 10.1 (Self Generated Noise with Microphone Installed) omitted.

Test Engineer [REDACTED]

APPROVED SIGNATORY [redacted]

[REDACTED] / [REDACTED]

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CERTIFICATE OF CALIBRATION



CERTIFICATE NO. CAL120912.
DATE OF ISSUE 07/12/2009.

Information relating to the operation and adjustment of the sound level meter were obtained from the data contained in the Rion Instruction Manual 32005 and associated Technical Notes 32042. Additional information relating to measurement uncertainties required by clause 11.3 has been provided by the Rion European Office and is available for inspection upon request.

Results

Tests on the Sound Level Meter were principally performed on the Main Channel. Limited tests were also performed using the Sub-Channel.

No Acoustic Calibrator was supplied with the instrument. When ANV Measurement Systems' B&K 4226 s/n 1445373 was initially applied the Sound Level Meter read 94.1dB (A). The meter was adjusted to read 93.9 dB (A) derived from the current calibration certificate for the calibrator at the indicated frequency of 1000 Hz.

The environmental conditions at the start and end of the calibration were within the specified range for calibration and were noted to be as follows:

Conditions	Measured Value at Start	Measured Value at End
Temperature	22.6 °C	23.0 °C
Relative Humidity	37.8 %	38.1 %
Atmospheric Pressure	98.9 kPa	98.8 kPa

The self generated noise levels of the instrument with the microphone replaced by the electrical input device were:

11.2 dB (A);
18.6 dB (C); and
23.6 dB (Z).

These measured levels were within the specified limits defined within the instruction manual.

The Sound Level Meter submitted for testing has successfully completed the Class 1 Periodic Tests of BS EN 61672, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about the conformance of the Sound Level Meter to the full requirements of BS EN 61672-1:2003 because evidence was not publically available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements of BS EN 61672-1:2003 and because the periodic tests of BS EN 61672-3:2006 only cover a limited subset of the specifications in BS EN 61672-1:2003.

The calibration incorporated the windshield corrections supplied by the manufacturer and the results are therefore applicable to the instrument with the microphone and pre-amplifier attached with the windscreen fitted.

CERTIFICATE OF CALIBRATION



CERTIFICATE NO. **CAL120912.**
DATE OF ISSUE **07/12/2009.**

No information on the uncertainty of measurement, required by 11.7 of IEC 61672-3:2006, of the adjustment data given in the instruction manual or obtained from the manufacturer of the Sound Level Meter, or the manufacturer of the Microphone, or the manufacturer of the multi-frequency Sound Calibrator was published in the instruction manual or made available by the manufacturer or supplier. The uncertainty of measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the Sound Level Meter may not conform to the requirements of IEC 61672-1:2002.

The total expanded measurement uncertainties associated with the calibration equipment and procedures is based on a standard uncertainty multiplied by a coverage factor $k=2$ to provide a confidence of approximately 95% in the results. The assessment of uncertainty has been carried out in accordance with national and international guidance upon the calculation of uncertainties in metrology.

Notes

1. The tests were conducted principally on the main channel, with a limited number of tests conducted for the sub channel. The Peak C sound level measurements were carried out for the sub channel as they are only available on this channel.
2. The instrument was running firmware version 1.0009.



CERTIFICATE OF CALIBRATION

Certificate Number CAL061003
Date of Issue 03/06/2010
Customer TNEI Services Ltd

Description of Instrument

Sound Level Meter Rion NL-31 Sound Level Meter [Serial No. 01273082] with Rion UC-53A Microphone [Serial No. 313385] and Rion NH-21 Preamplifier [Serial No. 26001] Fitted with a WS-10 foam windshield.

The instrument successfully completed the Class 1 Periodic Tests of BS EN 61672.

Associated Calibrator B & K 4226 S/N 1445373.

Date of Calibration 03/06/2010.

Test Procedure ..\..\Calibration Results Sheets\Current Approved Results Sheets\NL-31 Master 61672-3 Approved Issue 6 (BK 1445373).xls

Test procedures in accordance with BS EN 61672-3:2006.
NOTE: Test 10.1 (Self Generated Noise with Microphone Installed) omitted.

Test Engineer [REDACTED]

APPROVED SIGNATORY [redacted]

[REDACTED] / [REDACTED]

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CERTIFICATE OF CALIBRATION



CERTIFICATE No. CAL061003
DATE OF ISSUE 03/06/2010.

Information relating to the operation and adjustment of the sound level meter were obtained from the data contained in the Rion Instruction Manual 32005 and associated Technical Notes 32042. Additional information relating to measurement uncertainties required by clause 11.3 has been provided by the Rion European Office and is available for inspection upon request.

Results

Tests on the Sound Level Meter were principally performed on the Main Channel. Limited tests were also performed using the Sub-Channel.

No Acoustic Calibrator was supplied with the instrument. When ANV Measurement Systems' B&K 4226 s/n 1445373 was initially applied the Sound Level Meter read 94.3dB (A). The meter was adjusted to read 93.9 dB (A) derived from the current calibration certificate for the calibrator at the indicated frequency of 1000 Hz.

The environmental conditions at the start and end of the calibration were within the specified range for calibration and were noted to be as follows:

Conditions	Measured Value at Start	Measured Value at End
Temperature	22.9 °C	24.5 °C
Relative Humidity	41.4 %	40.0 %
Atmospheric Pressure	101.4 kPa	101.5 kPa

The self generated noise levels of the instrument with the microphone replaced by the electrical input device were:

09.5 dB (A);
16.4 dB (C); and
21.8 dB (Z).

These measured levels were within the specified limits defined within the instruction manual.

The Sound Level Meter submitted for testing has successfully completed the Class 1 Periodic Tests of BS EN 61672, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about the conformance of the Sound Level Meter to the full requirements of BS EN 61672-1:2003 because evidence was not publically available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements of BS EN 61672-1:2003 and because the periodic tests of BS EN 61672-3:2006 only cover a limited subset of the specifications in BS EN 61672-1:2003.

The calibration incorporated the windshield corrections supplied by the manufacturer and the results are therefore applicable to the instrument with the microphone and pre-amplifier attached with the windscreen fitted.

CERTIFICATE OF CALIBRATION



CERTIFICATE NO. **CAL061003**
DATE OF ISSUE **03/06/2010.**

No information on the uncertainty of measurement, required by 11.7 of IEC 61672-3:2006, of the adjustment data given in the instruction manual or obtained from the manufacturer of the Sound Level Meter, or the manufacturer of the Microphone, or the manufacturer of the multi-frequency Sound Calibrator was published in the instruction manual or made available by the manufacturer or supplier. The uncertainty of measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the Sound Level Meter may not conform to the requirements of IEC 61672-1:2002.

The total expanded measurement uncertainties associated with the calibration equipment and procedures is based on a standard uncertainty multiplied by a coverage factor $k=2$ to provide a confidence of approximately 95% in the results. The assessment of uncertainty has been carried out in accordance with national and international guidance upon the calculation of uncertainties in metrology.

Notes

1. The tests were conducted principally on the main channel, with a limited number of tests conducted for the sub channel. The Peak C sound level measurements were carried out for the sub channel as they are only available on this channel.
2. The instrument was running firmware version 1.050.



CERTIFICATE OF CALIBRATION

Certificate Number CAL120901
Date of Issue 02/12/2009
Customer TNEI Services Ltd

Description of Instrument

Calibrator Rion NC-74 [Serial No. 34762316]
With 1/2" adaptor type NC-74-002 fitted.

Date of Calibration 02/12/2009.

Test Procedure ..\..\Calibration Results Sheets\Current Approved Results
Sheets\NC-74 Master 60942 Approved Issue 2 (BK 1445373).xls

Test procedures in accordance with BS EN 60942: 2003 (Annex B)

Test Engineer [REDACTED]

APPROVED SIGNATORY [redacted]

[REDACTED] / [REDACTED]

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CERTIFICATE OF CALIBRATION



CERTIFICATE NO. CAL120901.
DATE OF ISSUE 02/12/2009.

Results

The sound pressure level generated in its half inch configuration was measured using a Rion UC-53A microphone with its protective grid in position.

The environmental conditions at the start and end of the calibration were within the specified range for calibration and were noted to be as follows:

Conditions	Measured Value at Start	Measured Value at End
Temperature	22.0 °C	22.5 °C
Relative Humidity	39.5 %	38.3 %
Atmospheric Pressure	98.6 kPa	98.6 kPa

The mean level of the calibrator output was **93.85 ± 0.26dB**.

The fundamental frequency of the sound output was **1002.4 Hz ± 0.3%** and its total distortion was **1.27 ± 0.02%**.

The Sound Calibrator has been shown to conform to the Class 1 requirements for periodic testing, described in Annex B of IEC 60942: 2003 for the sound pressure level and frequency stated, for the environmental conditions under which the tests were performed. However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of sound calibrator conformed to the requirements for pattern evaluation described in Annex A of IEC 60942: 2003, no general statement or conclusion can be made about conformance of the Sound Calibrator to the requirements of IEC 60942: 2003.

The total expanded measurement uncertainties associated with the calibration equipment and procedures is based on a standard uncertainty multiplied by a coverage factor $k=2$ to provide a confidence of approximately 95% in the results. The assessment of uncertainty has been carried out in accordance with national and international guidance upon the calculation of uncertainties in metrology.

Notes

1. The manufacturer states that the instrument compensates for the effects of atmospheric pressure (96 – 106 kPa ± 0.03 dB).
2. The Sound Calibrator has not been adjusted.

APPENDIX 4 - Calibration Certificates for the Meteorological Mast

DEUTSCHER KALIBRIERDIENST **DKD**

Kalibrierlaboratorium / Calibration laboratory
 Akkreditiert durch die / accredited by the
 Akkreditierungsstelle des Deutschen Kalibrierdienstes



Deutsche WindGuard
 Wind Tunnel Services GmbH
 Varel



Kalibrierschein Calibration Certificate

Kalibrierzeichen
 Calibration label

10/5827
DKD-K-36801
08/2010

Gegenstand <i>Object</i>	A 100 LK
Hersteller <i>Manufacturer</i>	Windspeed LTD Denbighshire LL18 2AB
Typ <i>Type</i>	A 100 LK
Fabrikat/Serien-Nr. <i>Serial number</i>	Body: 9051 Cup: E52P
Auftraggeber <i>Customer</i>	Western Windpower UK Gloucestershire GL53AP
Auftragsnummer <i>Order No.</i>	VT10511
Anzahl der Seiten des Kalibrierscheines <i>Number of pages of the certificate</i>	3
Datum der Kalibrierung <i>Date of calibration</i>	06.08.2010

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI). Der DKD ist Unterzeichner der multi- lateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine.

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI). The DKD is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.

The user is obliged to have the object recalibrated at appropriate intervals.

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Akkreditierungsstelle des DKD als auch des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.

This calibration certificate may not be reproduced other than in full except with the permission of both the Accreditation Body of the DKD and the issuing laboratory. Calibration certificates without signature and seal are not valid.

Stempel <i>Seal</i>	Datum <i>Date</i>	Leiter des Kalibrierlaboratoriums <i>Head of the calibration laboratory</i>	Bearbeiter <i>Person in charge</i>
	06.08.2010	[redacted]	[redacted]

Kalibriergegenstand
Object

Anemometer

Kalibrierverfahren
Calibration procedure

IEC 61400 12 1 - Wind Turbine Power Performance Testing 12 2005
MEASNET - Cup Anemometer Calibration Procedure – 09 1997
ISO 3966 – Measurement of fluid in closed conduits - 1977

Ort der Kalibrierung
Place of calibration

Windtunnel of Deutsche WindGuard, Varel

Messbedingungen
Test Conditions

wind tunnel area ¹⁾	10000 cm ²
anemometer frontal area ²⁾	200 cm ²
diameter of mounting pipe ³⁾	27 mm
blockage ratio ⁴⁾	0.020 [-]
blockage correction ⁵⁾	1.000 [-]

Umgebungsbedingungen
Test conditions

air temperature	24.0 °C	± 0.2 K
air pressure	1016.3 hPa	± 0.3 hPa
relative air humidity	48.5 %	± 2.0 %

Akkreditierung
Accreditation

08 / 2009

Anmerkungen
Remarks

calibrated with Type 405 Single Mount

Auswertesoftware
Software version

5.0

- ¹⁾ Querschnittsfläche der Auslassdüse des Windkanals
²⁾ Vereinfachte Querschnittsfläche (Schattenwurf) des Prüflings inkl. Montagerohr
³⁾ Durchmesser des Montagerohrs
⁴⁾ Verhältnis von 2) zu 1)
⁵⁾ Korrekturfaktor durch die Verdrängung der Strömung durch den Prüfling

Anmerkung: Aufgrund der speziellen Konstruktion der Messstrecke ist keine Korrektur nötig.

Remark: Due to the special construction of the test section no blockage correction is necessary

Dieser Kalibrierschein wurde elektronisch erzeugt

This calibration certificate has been generated electronically

Kalibrierergebnis:

Result:

Test Item (1/s)	Tunnel Speed (m/s)	Uncertainty (k=2) (m/s)
79.276	4.150	0.05
118.516	6.126	0.05
156.269	7.999	0.05
193.208	9.853	0.05
232.967	11.832	0.05
271.626	13.792	0.05
310.870	15.763	0.05
291.138	14.728	0.05
252.429	12.823	0.05
212.043	10.830	0.05
174.209	8.898	0.05
135.456	6.974	0.05
100.360	5.211	0.05

Angegeben ist die erweiterte Messunsicherheit, die sich aus der Standardmessunsicherheit durch Multiplikation mit dem Erweiterungsfaktor $k=2$ ergibt. Sie wurde gemäß DKD-3 ermittelt. Der Wert der Messgröße liegt mit einer Wahrscheinlichkeit von 95 % im zugeordneten Wertintervall.

Der Deutsche Kalibrierdienst ist Unterzeichner der multilateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine. Die weiteren Unterzeichner innerhalb und außerhalb Europas sind den Internetseiten von EA (www.european-accreditation.org) und ILAC (www.ilac.org) zu entnehmen.

The expanded uncertainty assigned to the measurement results is obtained by multiplying the standard uncertainty by the coverage factor $k = 2$. It has been determined in accordance with DKD-3. The value of the measurand lies within the assigned range of values with a probability of 95%.

The DKD is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.

1 Detailed MEASNET¹ Calibration Results

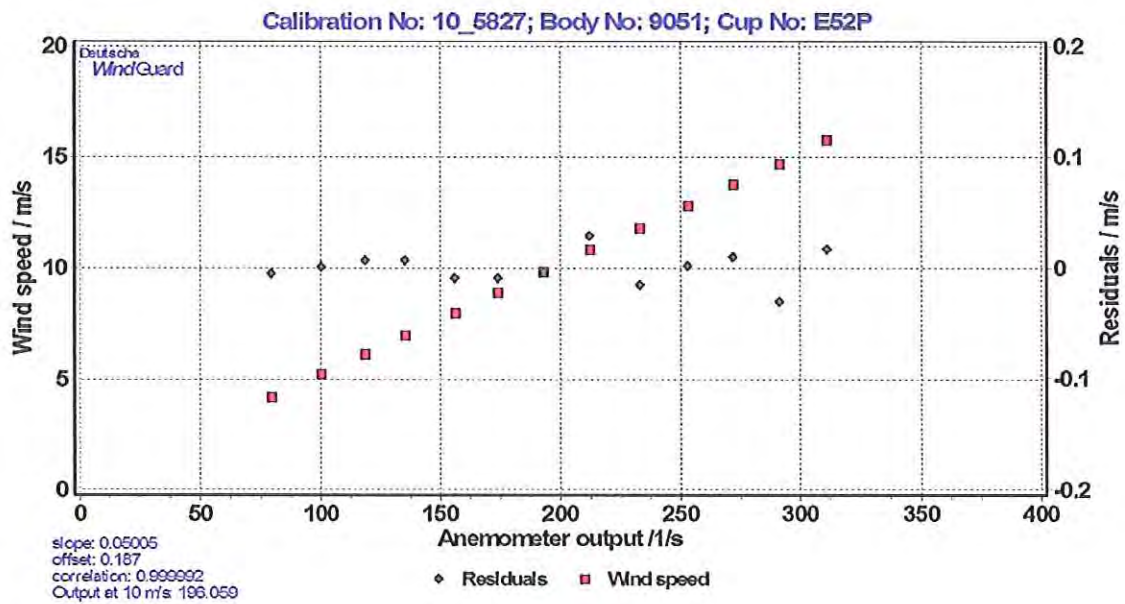
DKD calibration no. 10/5827
 Body no. 9051
 Cup no. E52P
 Date 06.08.2010
 Air temperature 24.0 °C
 Air pressure 1016.3 hPa
 Humidity 48.5 %



Linear regression analysis

Slope 0.05005 (m/s)/(1/s) ± 0.00006 (m/s)/(1/s)
 Offset 0.187 m/s ± 0.013 m/s
 St.err(Y) 0.016 m/s
 Correlation coefficient 0.999992

Remarks no



¹) According to MEASNET Cup Anemometer Calibration Procedure 09/1997. Deutsche WindGuard Wind Tunnel Services is accredited by MEASNET and by the Deutscher Kalibrierdienst – DKD (German Calibration Service). Registration: DKD – K – 36801