



accredited by the / akkreditiert durch die

Deutsche Akkreditierungsstelle GmbH

as calibration laboratory in the / als Kalibrierlaboratorium im

Deutschen Kalibrierdienst



Deutsche
Akkreditierungsstelle
D-K-15140-01-00

Calibration certificate
Kalibrierschein

Calibration mark
Kalibrierzeichen

1922677
D-K-
15140-01-00
08/2019

Object <i>Gegenstand</i>	Combined Wind Sensor
Manufacturer <i>Hersteller</i>	BARANI DESIGN, s.r.o. Slovakia
Type <i>Typ</i>	METEOWIND COMPACT
Serial number <i>Fabrikat/Serien-Nr.</i>	BW190811001
Customer <i>Auftraggeber</i>	BARANI DESIGN, s.r.o. Slovakia
Order No. <i>Auftragsnummer</i>	Email 2019-07-30, Barani
Project No. <i>Projektnummer</i>	VT190709
Number of pages <i>Anzahl der Seiten</i>	4
Date of Calibration <i>Datum der Kalibrierung</i>	27.08.2019

This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).

The DAkKS 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 dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).

Die DAkKS ist Unterzeichner der multilateralen 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 may not be reproduced other than in full except with the permission of both the German Accreditation Body and the issuing laboratory. Calibration certificates without signature are not valid. This calibration certificate has been generated electronically.

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

Date
Datum

27.08.2019

Head of the calibration laboratory
Leiter des Kalibrierlaboratoriums

Dipl. Phys. Dieter Westermann

Person in charge
Bearbeiter

Alina Roß, M. Sc.

Calibration object <i>Kalibriergegenstand</i>	Combined Wind Sensor										
Calibration procedure <i>Kalibrierverfahren</i>	VA Anemometer calibration (D5831 Version 13)										
Place of calibration <i>Ort der Kalibrierung</i>	Wind tunnel of Deutsche WindGuard WindTunnel Services GmbH, Varel										
Test conditions <i>Messbedingungen</i>	<table><tr><td>wind tunnel area</td><td>10000 cm²</td></tr><tr><td>anemometer frontal area</td><td>200 cm²</td></tr><tr><td>diameter of mounting pipe</td><td>20.0 mm</td></tr><tr><td>blockage ratio ¹⁾</td><td>0.020 [-]</td></tr><tr><td>software version</td><td>P_8.0.03</td></tr></table> <p>¹⁾ Due to the special construction of the test section no blockage correction is necessary.</p>	wind tunnel area	10000 cm ²	anemometer frontal area	200 cm ²	diameter of mounting pipe	20.0 mm	blockage ratio ¹⁾	0.020 [-]	software version	P_8.0.03
wind tunnel area	10000 cm ²										
anemometer frontal area	200 cm ²										
diameter of mounting pipe	20.0 mm										
blockage ratio ¹⁾	0.020 [-]										
software version	P_8.0.03										
Ambient conditions <i>Umgebungsbedingungen</i>	<table><tr><td>air temperature</td><td>30.2 °C ± 0.1 °C</td></tr><tr><td>air pressure</td><td>1014.8 hPa ± 0.3 hPa</td></tr><tr><td>relative air humidity</td><td>40.5 % ± 2.0 %</td></tr></table>	air temperature	30.2 °C ± 0.1 °C	air pressure	1014.8 hPa ± 0.3 hPa	relative air humidity	40.5 % ± 2.0 %				
air temperature	30.2 °C ± 0.1 °C										
air pressure	1014.8 hPa ± 0.3 hPa										
relative air humidity	40.5 % ± 2.0 %										
Measurement uncertainty <i>Messunsicherheit</i>	<p>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 DAkkS-DKD-3. The value of the measurand lies within the assigned range of values with a probability of 95%.</p> <p>The reference flow speed measurement is traceable to the German NMI (Physikalisch-Technische Bundesanstalt) standard for flow speed. It is realized by using a PTB owned and calibrated Laser Doppler Anemometer (Standard Uncertainty 0.2 %, $k=2$)</p>										
Additional remarks <i>Zusätzliche Anmerkungen</i>	Orientation: 180° Mount is unstable under wind load										
Revision <i>Revision</i>	0										

Calibration result
Kalibrierergebnis

Reference Air velocity m/s	Reference Unc m/s	Test item Speed Hz	Test item Direction V
1.967	0.05	2.754	1.218
3.862	0.05	5.569	1.218
5.873	0.05	8.647	1.218
9.766	0.05	14.678	1.218
13.683	0.05	20.832	1.217
17.585	0.10	26.972	1.215
22.491	0.10	34.942	1.216
28.510	0.10	44.576	1.219
33.484	0.10	52.462	1.217
36.758	0.10	57.606	1.215
36.365	0.10	56.917	1.215
30.640	0.10	47.769	1.218
25.582	0.10	39.899	1.217
19.607	0.10	30.180	1.216
15.618	0.05	23.806	1.215
11.742	0.05	17.727	1.216
4.860	0.05	7.079	1.217
2.959	0.05	4.181	1.217
1.019	0.05	1.302	1.218
0.489	0.05	0.465	1.225

Statistical analysis		
Slope		0.63347 (m/s)/(Hz) ±0.00132 (m/s)/(Hz)
Offset		0.3582 m/s ±0.042 m/s
Standard error (Y)		0.044 m/s
Correlation coefficient		0.999961

Graphical representation of the result
Grafische Darstellung des Ergebnisses

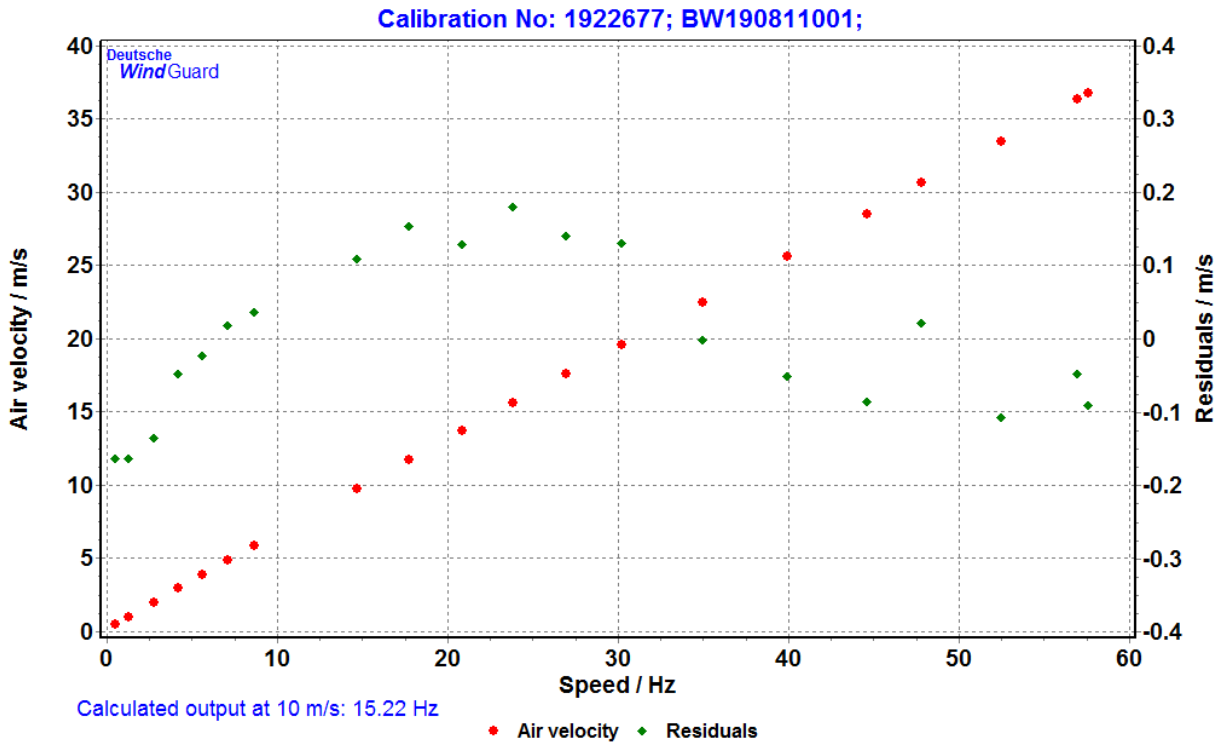
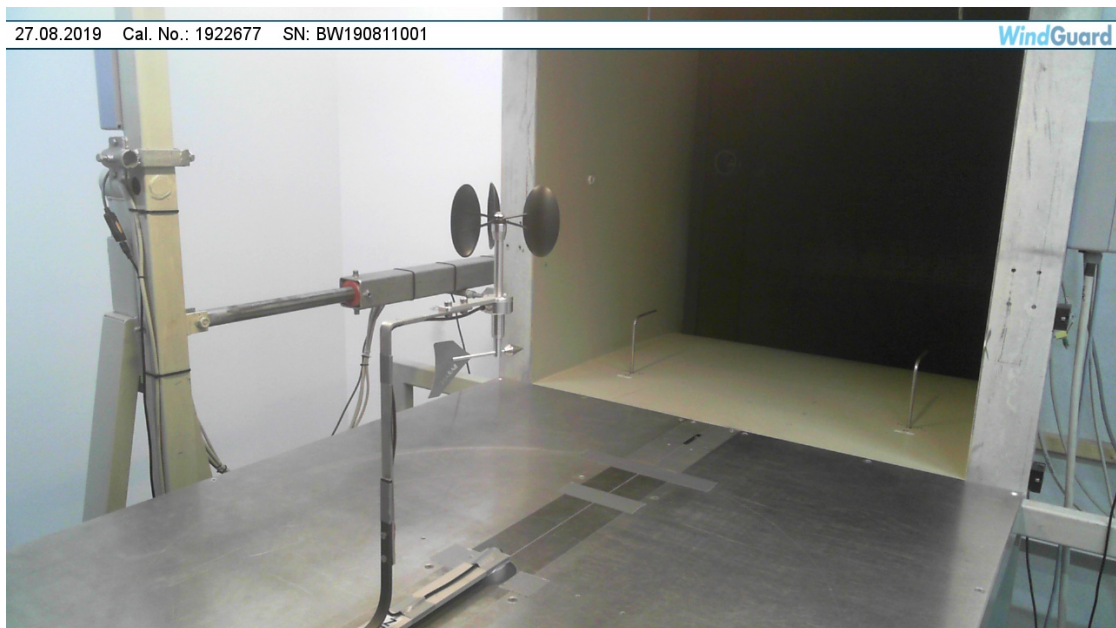


Photo of the measurement setup
Foto des Messaufbaus



Remark: The proportions of the set-up may not be true to scale due to imaging geometry.

- End of document / Ende des Dokuments -