

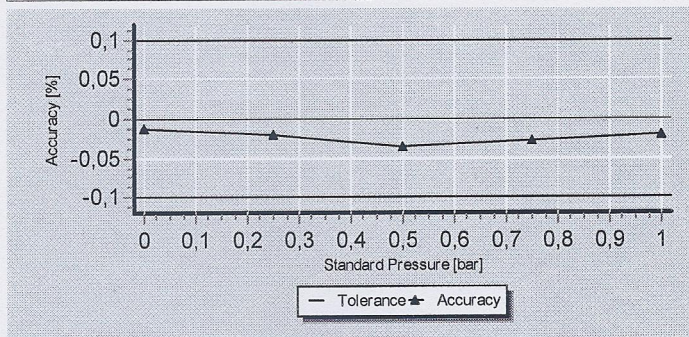
Test Report P-30

Accuracy* (10 ... 60 °C): 0.1 %
 Pressure range: 0 ... 1 bar rel.
 Signal: 0 ... 10 V
 ProductNo. (P#): 38341505
 Serial No. (S#): 2252914

Results

Standard bar	Accuracy *	
	V	%
0.000	-0.001	-0.012
0.250	2.498	-0.021
0.500	4.996	-0.035
0.750	7.497	-0.028
1.000	9.998	-0.021

* Including non-linearity, hysteresis, zero point and full scale error (corresponds to error of measurement per IEC 61298-2).



SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM



WIKA Instruments (Pty) Ltd - South Africa

CALIBRATION LABORATORY FOR PRESSURE MEASUREMENT



Certificate Number

A 9914
SANAS
246

Certificate of Calibration

Calibration of a	Transmitter
Manufacturer	WIKA INSTRUMENTS
Type	P-30
Range	0 ... 1 bar
Serial number	<u>2252914</u>
Tag number	<u>n/a</u>
Customer	University Of Pretoria Roper Street Room 3/57, Admin. Building Pretoria
	South Africa
Order No.	0000327065
Number of pages of the certificate	4
Date of calibration	14/08/2015
Recalibration Date As Per Customer	August 2016

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

The South African National Accreditation System (SANAS) is a member of the International Laboratory Accreditation Committee (ILAC) for the Mutual Recognition Agreement. This arrangement allows for the mutual recognition of technical test and calibration data by the member's accreditation bodies worldwide. For more information on the MRA please consult www.ilac.org

The values in this certificate are correct at the time of calibration/certification. Subsequently the accuracy will depend on such factors as operating temperature, the care exercised in handling, frequency of use and its use under conditions other than specified by the manufacturer and/or conditions of calibration/certification. Recertification should be performed after a period that has been chosen by the user to ensure that the equipment's accuracy remains within the desired limits. The user is obliged to have the object recalibrated at these intervals.

The reported results are only valid for the object calibrated. Legal liability shall be limited to the cost of recalibration and or certification, but the applicant indemnifies WIKA INSTRUMENTS against any consequential or other loss.

This calibration certificate may not be reproduced other than in full except with the permission of the issuing laboratory. Calibration certificates without Technical Signatory's signature and seal are not valid.



Date of Issue

14/08/2015

SANAS Authorised Technical Signatory

Wellcome P.

Calibrated by

Calibration Technician

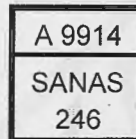
Mashiloane T.

WIKA Instruments (Pty) Ltd - South Africa



page 2 of 4: Date of calibration 14/08/2015

Certificate No.



Specification of device under test (DUT)

Pressure range	0 ... 1 bar
Method of measurement	Gauge pressure
Accuracy	0.1 % (of span)
Scale division	0.001 V
Output signal	0 ... 10 V

Used auxillary instruments

Digital-Voltmeter	Keithley 2000 S# 0972922
Shunt (250 Ohm)	-

Environmental conditions

Ambient Temperature in °C	20.8 +/- 1.6
Ambient pressure in mbar	838 +/- 0.59
Humidity %RH	29 +/- 5.7

Place/ Location of calibration

WIKA Laboratory Johannesburg

Reference Standard and test conditions

Working Standard (WS)	01783427DKD15-01
- Name	CPC 8000 S# Z80043C
- Range	-1 ... 1 bar
- Accuracy	0.0063 % referred tq span
Pressure media	Dry air
Reference height	Connection of obj.
Position during calibration	Vertical

Extensions

Calibration process

Method	Pressure-setting according to Reference
Cycle	B
Work instruction	LW-007 r6 & LW-012 r5

For calibration the following norm is used:

- DKD-R 6-1 Guideline for calibration of pressure gauges by German Calibration Service "Deutscher Kalibrier Dienst" (DKD) Edition 01/2003





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page 3 of 4: Date of calibration 14/08/2015

Certificate No.

A 9914
SANAS
246

Results

p _e WS bar	calculated DUT bar		
	M 1	M 2	M 3
0.0000	0.0002	0.0002	0.0001
0.2000	0.2001	0.2002	0.2001
0.4000	0.4001	0.4002	0.4002
0.6000	0.6002	0.6002	0.6002
0.8000	0.8002	0.8002	0.8002
1.0000	1.0003	1.0003	1.0003

Evaluation

p _e WS bar	Mean-value bar	Deviation bar	Repeat-ability b bar	Hysteresis bar	Uncertainty bar
0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
0.2000	0.2000	0.0000	0.0000	0.0000	0.0001
0.4000	0.4000	0.0000	0.0001	0.0000	0.0001
0.6000	0.6000	0.0000	0.0000	0.0000	0.0001
0.8000	0.8000	0.0000	0.0001	0.0000	0.0001
1.0000	1.0001	0.0001	0.0000	0.0000	0.0001

The deviation must be subtracted algebraically from the device under test (DUT) reading to obtain the correct value.
M1/M3 INDICATES RISING PRESSURE, M2/M4 INDICATES FALLING PRESSURE.
To convert in official-unit -kPa- use multiplier :100 kPa/bar

NOTE: All readings entered on computer directly.

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page 4 of 4: Date of calibration 14/08/2015

Certificate No.

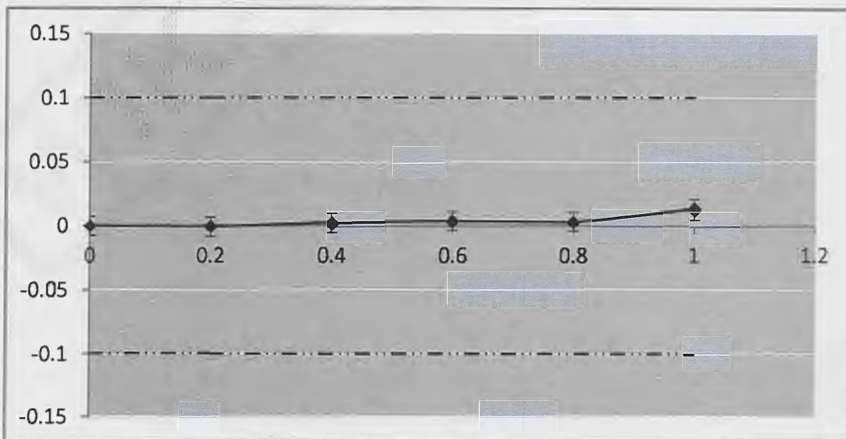
A 9914
SANAS
246

Uncertainty

The reported expanded uncertainty of measurement is valid after a correction of the reading value with the systematical deviation (see table "evaluation").

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of 95,45%, the uncertainty of measurement has been estimated in accordance with the principles defined in the GUM, 'Guide to Uncertainty of Measurement, ISO, Geneva, 1993'.

Graphic representation of the relative uncertainty



Legend	
X-axis	P_e in bar
Y-axis	rel. uncertainty in %

Accuracy of instrument

+/- 0.0002 bar = +/- 0.02 % referred to span

Label

The calibration object is labelled, which shows the number of this calibration certificate, serial/tag number and the date of calibration.

END OF CERTIFICATE.

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ATTACHMENT 10P-1 for certificate:

A 9914

Date of calibration

14/08/2015

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SANAS

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Listing of measured pressure-signals

pe bar	Output signal of transmitter V		
0.00	0.0015	0.0015	0.0014
0.20	2.0014	2.0015	2.0014
0.40	4.0015	4.0019	4.0019
0.60	6.0017	6.0020	6.0019
0.80	8.0016	8.0017	8.0021
1.00	10.0028	10.0027	10.0029

0.1 bar / V
0 bar

