

Certificate of Calibration Fluke Park Laboratory

Description:	Metrology Well	Certificate Number:	B9504005
Manufacturer:	Fluke	Date of Calibration:	04 May 2019
Model:	9170	Date Due:	
Serial Number:	B95379	Temperature:	20.0 to 26.0 °C
Status:	As-Found: New As-Left: In Tolerance	Relative Humidity:	15 to 70 %RH
Calibration:	Full	Pressure:	95 to 103 kPa
Procedure:	HCT300 - 3	Issue Date:	04 May 2019
Customer:	FLUKE SOUTH EAST ASIA PTE LTD SINGAPORE SG	RMA/SO Number:	9591582
PO Number:	17514/SG//STOCK		

This calibration is traceable to the SI through recognized national metrological institutes (NIST, PTB, NPL, NIM, NRC, etc.), radiometric techniques, or natural physical constants and is in compliance with ISO/IEC17025:2005 and ANSI/NCSL Z540.1. The calibration has been completed in accordance with the Fluke Corporate Quality System document QSD 111.0. Calibration certificates without identification of the authorizing person are not valid. This certificate applies to only the item identified and shall not be reproduced other than in full, without the specific written approval by Fluke Corporation.

This calibration certificate may contain data that is not covered by the Scope of Accreditation. The unaccredited test points, where applicable, are indicated by an asterisk (*), or confined to clearly marked sections. This certificate shall not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Measurement uncertainties at the time of test are given where applicable. They are calculated in accordance with the method described in the ISO Guide to the Expression of Uncertainty in Measurement. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

Comments:




 Approved Signatory

Amacy Rico

Standards Used

Description

1560 Digital Thermometer
1560 Thermometer, "Black Stack" Base Unit
2562-H Precision Digital Thermometer
2562-H Precision Digital Thermometer
5628 Platinum Resistance Thermometer
5628 Platinum Resistance Thermometer
Metrology Well Test Station

Serial Number

A26031
B08223
B08078
B14112
2259
3307
5

Due-Date

NCR
NCR
18-Dec-2019
28-Sep-2019
25-Mar-2020
17-Aug-2019
NCR

Quality Manuals

This calibration has been completed in accordance with:

The Fluke Corporate Quality Manual, QSD 111.00, Revision 122, Dated June, 2018 and/or

The Fluke 17025 Quality Manual, QSD 111.41, Revision 005, Dated Sept. 2014

The instrument described herein was calibrated by direct measurement of generated temperatures using the reference standards listed in the "Test Equipment" section of this report. The calibration was performed using test insert Model 917x-INST as described in the user manual. This insert is similar to insert "C" but is designed to accommodate the test PRTs and aid in the performance of the axial gradient calibration. The calibration data, internal calibration constants, and uncertainties are shown on the following page(s) of this report. The temperature accuracy test is self-explanatory. The axial differential temperature test is more complex. Due to the nature of the axial differential temperature characteristic and the influence of the test equipment on the test result, this test utilizes tolerances which do not precisely match the instrument specification. However, the unique tolerances used are intended to determine the axial differential temperature tolerance status based on the published specifications. The temperature observations were performed in both increasing and decreasing directions. The value shown for maximum hysteresis is the maximum difference between two observations of the same temperature. The nominal temperature at which the maximum difference was observed is also shown.

The calibration uncertainties are shown at a coverage factor of 2 ($k=2$). All known significant sources of uncertainty have been considered. Any limitations or remarks pertaining to this instrument and/or calibration are shown below. Additionally, out of tolerance indications, if any, are identified along with the corresponding data on the data pages of this report. Calibration uncertainties have been taken into account in the determination of tolerance status using risk analysis algorithms. When using the instrument in a calibration process, it is recommended that the instrument specifications be used as the contribution of the instrument rather than the calibration uncertainties. The instrument tolerances are shown on the report at a confidence interval of 95%.

The sections labeled Temperature Stability, Axial Differential Temperature and/or Maximum Hysteresis contain data that are not covered by the NVLAP Scope of Accreditation.

Certificate of Calibration

Model: 9170
 Serial No.: B95379
 Certificate No: B9504005

As Found Data

No As Found Data Required

As Left Data

Data ID: B9123092707565

Temperature Accuracy

Calibration Constants		Set-point °C	Actual °C	Error °C	Tolerance °C	Uncertainty	Pass/Fail
TEMP 1	0.105	-45.000	-45.021	-0.021	±0.100	±0.025	P
TEMP 2	0.087	-35.000	-34.998	0.002	±0.100	±0.025	P
TEMP 3	0.035	0.000	-0.021	-0.021	±0.100	±0.025	P
GRAD 1	-0.035	50.000	50.006	0.006	±0.100	±0.025	P
GRAD 2	0.013	100.000	99.994	-0.006	±0.100	±0.025	P
		140.000	140.000	0.000	±0.100	±0.025	P

Temperature Stability

Control Constants		Set-point °C	Observed °C (2 Sigma)	Tolerance °C	Uncertainty	Pass/Fail
TEMP PBAND	1.5	-45.000	0.0016	±0.0050	±0.0025	P
TEMP INT	20.0	140.000	0.0017	±0.0050	±0.0025	P
TEMP DER	1.5					
GRAD PBAND	5.0					
GRAD INT	40.0					

Axial Differential Temperature

Set-point °C	Target °C	Actual °C	Error °C	Tolerance °C	Uncertainty	Pass/Fail
-35.000	0.000	0.005	0.005	±0.020	±0.020	P
140.000	0.000	-0.006	-0.006	±0.035	±0.025	P

Settings

FAN LIMIT AUTO

Maximum Hysteresis

Set-point °C	Observed °C	Tolerance °C	Uncertainty	Pass/Fail
50.000	0.012	±0.025	±0.0050	P