

CERTIFICATE OF CALIBRATION

Certificate Number **RH00784**
Date of Issue **15th December 2017**



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48 Lancaster Way Business Park
Ely, Cambridgeshire
CB6 3NW
United Kingdom

Tel: +44 (0)1353 658000
Fax: +44 (0)1353 658199
e-mail: uk.info@michell.com
Website: www.michell.com

Approved Signatory
Mr S. Daines

S. Daines

Accredited to
ISO/IEC 17025:2005

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Customer	Michell Instruments Ltd.
Customer address	48 Lancaster Way Business Park, Ely, Cambs. CB6 3NW
Customer order number	122-00-8027
Received	N/A
Instrument	Michell Instruments Opti-Cal. Integrated humidity calibrator.
Opti-Cal serial number	071476
Serial number Instrument	154675
Sensor	153905 Temperature probe 155972
Michell reference number	M65567
Measurements performed	11 th to 13 th December 2017
Laboratory temperature	21 °C ±2 °C
Laboratory humidity	28 %rh ±10 %rh

The Opti-Cal instrument was calibrated by comparison using reference instruments with UKAS calibration certificates.

The dew point sensor was removed from the Opti-Cal chamber and placed in a climatic chamber with the reference hygrometer sensor. Another, non-functional sensor was used to plug the sensor hole. The two reference temperature probes were inserted 170 mm into the Opti-Cal chamber, through the left and right hand ports of the front access plate. The Opti-Cal chamber humidity was set to match the calibration conditions for each test point of this certificate.

The sample air from the Michell Instruments dew point generator was divided, with one path to the reference hygrometer and the other to the hygrometer being calibrated.

The optical surfaces of the hygrometers were cleaned using de-ionised water, prior to the calibration.

The output used from the hygrometer was the digital display with a resolution to 0.1, for all parameters.

At each relative humidity, time was allowed to ensure that the calibration conditions had stabilised. This was confirmed while recording the 10 readings (at 2 minute intervals) that are averaged to give the figures recorded in this certificate.

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Applied temperature °C	Applied RH %rh	Test instrument					
		Indicated temperature °C	Correction temperature °C	Expanded uncertainty temperature °C	Indicated RH %rh	Correction RH %rh	Expanded uncertainty RH %rh
21.05	14.98	21.0	+0.1	±0.24	15.1	-0.1	±0.36
21.05	50.37	21.0	+0.1	±0.24	51.1	-0.7	±1.2
21.03	74.75	21.0	0.0	±0.24	75.5	-0.7	±1.8
39.93	15.12	40.0	-0.1	±0.24	15.1	0.0	±0.36
39.93	50.20	40.0	-0.1	±0.24	50.3	-0.1	±1.2
39.97	74.63	40.0	0.0	±0.24	74.9	-0.3	±1.8

Applied temperature °C	Applied Dew point °C	Test instrument		
		Indicated Dew point °C	Correction Dew point °C	Expanded uncertainty Dew point °C
21.05	-5.84	-5.7	-0.1	±0.25
21.05	10.35	10.5	-0.1	±0.25
21.03	16.38	16.5	-0.1	±0.25
39.93	8.53	8.6	-0.1	±0.25
39.93	27.59	27.7	-0.1	±0.25
39.97	34.59	34.7	-0.1	±0.25

Dew points below 0 °C are measured over ice, unless otherwise stated.

The indicated sample flow rate through the dew point sensor was 1.0 l/min.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

The uncertainties quoted in the Certificate of Calibration only apply to the measured value obtained during the period of calibration and are not indicative of the long-term stability of the instrument under test.