

Humidity Calibration Solutions



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The Importance of Regular Calibration

The reliable operation of a hygrometer and indeed any measuring instrument, can only be verified by periodic calibration against a dependable reference system. All hygrometers from Michell Instruments are delivered with a calibration certificate, but this alone will not guarantee the measurement performance throughout their life. Exposure to contaminants within the measurement of gas can cause measurement performance errors. To have confidence in the performance of a sensor it must be verified by periodic calibration.

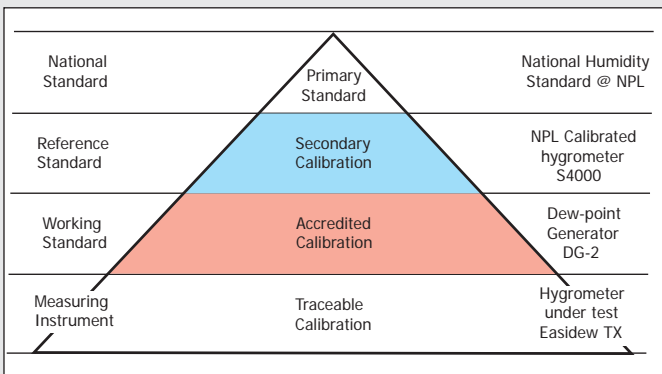
Michell Instruments Calibration Services

Michell's UKAS (United Kingdom Accreditation Service) laboratory was established back in 1986 and was the first laboratory in the UK to be accredited for the dew point calibration of hygrometers. The capability of the Calibration laboratory has been maintained and developed over the years and Michell can now offer calibrations over the range -90°C to $+90^{\circ}\text{C}$ dew point with a best measurement capability of $\pm 0.15^{\circ}\text{C}$ dew point. In addition to this Michell can provide traceable calibrations to NIST (National Institute for Standards and Technology – USA).

Calibration Standards

Each country will hold its own National Standard for dew point and humidity. This may be a primary standard. Other calibration facilities will have reference instrumentation calibrated against the Primary Standard and use this as their standard. In this approach a pyramid structure is generated. This structure gives confidence in the calibration process as traceability of calibrations is visible.

Calibration Pyramid



Background to Michell Instruments

Michell Instruments is the international leader in the field of moisture and humidity measurement solutions. With over 30 years experience, Michell designs and manufactures a wide range of transmitters, instruments and system solutions capable of measuring trace moisture, humidity and dew point in a vast range of applications and industries ranging from compressed air, power generation, process, oil and gas, pharmaceutical and many more.

With a fast growing international subsidiary and distribution network, the Michell Group provides solutions in moisture and humidity for the most demanding applications worldwide.

Michell uses four key dew point measurement technologies in their products:

- Impedance method using a ceramic tile which delivers unrivalled speed of response and robustness.
- Chilled Mirror method which has been incorporated into advanced, precision instruments for industrial and laboratory use.
- Capacitive – provides fast, accurate measurement of relative humidity in air and other gases
- Dark spot technology, which was developed in partnership with Shell, to offer a world-class solution for the measurement of hydrocarbon dew point.
- Quartz crystal technology for a high precision, fast responding moisture measurement with self-calibration.

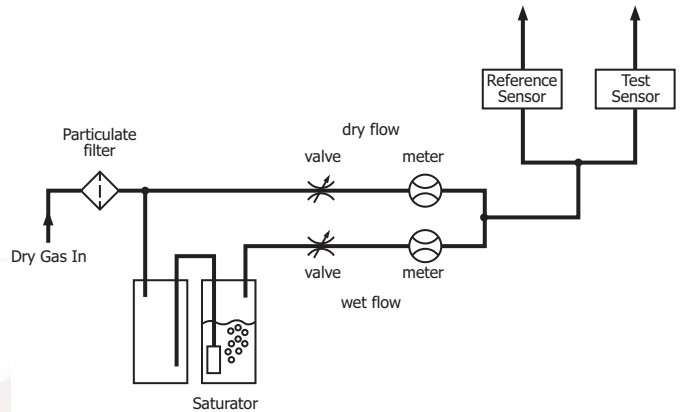
Applications for calibration instruments

- Metrology Laboratories
- Meteorology Laboratories
- Calibration Laboratories
- Industrial Gas Producers
- Pharmaceutical Companies
- Humidity Sensor / Instrument Manufacturers
- ... and many more



The Technology

All the calibration systems and generators offered by Michell Instruments generate a gas that is suitable for the calibration of sensors by gas dilution. This method works by mixing different volumes of wet and dry gas then performing a check with a reference instrument to produce a gas of known humidity which can then be used to calibrate other humidity sensors. Both trace moisture and high-humidity gas can be produced using this method, with traceability of calibration achieved through the reference instrument.



Calibration Instrumentation

A comprehensive range of calibration systems for the calibration of trace moisture dew-point sensors to relative humidity sensors. The modular system of components enables systems to be designed to specific performance requirements and for the provision for everything from dry gas source to a transfer standard reference hygrometer.

Calibration Systems

- Relative humidity or dew-point calibration systems
- Wide range of dew point and humidity can be generated
- Portable calibrators
- Self-contained calibrators
- Reference instruments with calibration traceable to National Standards
- Complete system design



Components – Dew-Point and RH Generators

- Manual, semi-automatic and PC controlled systems
- Comprehensive generation range from trace moisture to high humidity
- Excellent generation stability
- Can be supplied as a stand-alone or system components



Reference Instrumentation

- Transfer standard reference hygrometers
- Fundamental chilled mirror measurement technology
- UKAS accredited calibration as standard



Auxiliaries

- Mini-compressor package
- Pressure swing dryers
- Temperature chambers
- Sensor manifolds



<h3>Humidity Salts</h3>		<p>Humidity Range Operating Temp. (ambient) Stability</p>	<p>12, 33, 55, 75, 90%RH typically +21°C <0.5%RH</p>												
<h3>S503</h3> <p>Humidity calibrator</p>		<p>Humidity Range Operating Temp. (ambient) Stability Probe Points Reference Sensor</p>	<p>10 to 90%RH 15 to 35°C <0.5%RH 7 Relative humidity (optional chilled mirror sensor)</p>												
<h3>HG1</h3> <p>Humidity calibrator</p>		<p>Humidity Range Operating Temp. Stability Probe Points Reference Sensor</p>	<p>10 to 90%RH 15 to 35°C <0.5%RH Designed to requirements Chilled mirror (optional)</p>												
<h3>DG1, 2, 3, 4</h3> <p>Dew-Point Generator Range (manual and semi-automatic mixing)</p>		<p>Humidity Range Operating Temp.</p>	<table border="1"> <thead> <tr> <th>DG1</th> <th>DG2</th> <th>DG3</th> <th>DG4</th> </tr> </thead> <tbody> <tr> <td>-40 to +20°Cdp</td> <td>-75 to +20°Cdp</td> <td>-40 to +20°Cdp</td> <td>-75 to +20°Cdp</td> </tr> <tr> <td></td> <td>+18 to +24°C</td> <td></td> <td></td> </tr> </tbody> </table>	DG1	DG2	DG3	DG4	-40 to +20°Cdp	-75 to +20°Cdp	-40 to +20°Cdp	-75 to +20°Cdp		+18 to +24°C		
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<h3>VDS 3</h3> <p>Fully automated mixing</p>		<p>Humidity Range Gas Output</p>	<p>-100 to +20°Cdp 10 l/m at 0.5 barg</p>												
<h3>S904</h3> <p>Humidity and temperature calibrator</p>		<p>Humidity Range Operating Temp. Stability Probe Points Reference Sensor</p>	<p>10 to 90%RH 10* to 50°C <0.2%RH 5 Relative Humidity</p>												
<h3>OptiCal</h3> <p>Humidity and temperature calibrator</p>		<p>Humidity Range Operating Temp. Stability Probe Points Reference Sensor</p>	<p>10 to 90%RH 10* to 50°C <0.2%RH 5 Chilled Mirror</p>												
<h3>HG10</h3> <p>Humidity and temperature calibration systems</p>		<p>Humidity Range Operating Temp. Configuration Reference Sensor</p>	<p>1 to 95%RH 10 to 80°C Designed to requirements Chilled Mirror</p>												
<h3>DCS</h3> <p>Dew-point calibration systems</p>		<p>Humidity Range Stability Configuration Reference Sensor</p>	<p>-100 to 20°Cdp <0.5%RH Designed to requirements Chilled Mirror</p>												

*Dependent on room ambient temperature

Michell Instruments operates in the following markets:

- Compressed Air Dryers
- Pharmaceutical
- Standards Laboratories and Metrology
- Semiconductors
- Natural Gas and Petrochemicals
- Industrial and Pure Gas Production
- Power Generation

Other Product Ranges

Dew-Point Transmitters

Michell offers the widest range of dew-point sensors and transmitters on the market. From the industry standard Easidew 2-wire transmitter to the new, rugged Easidew PRO IS for hazardous areas, all are supplied with sensors traceable to national standards.

Portable Instruments

Michell's range of easy-to-operate portable instruments provides fast, accurate and stable measurement of dew point, relative humidity and moisture concentration. They are designed to satisfy the most demanding industrial conditions, and are unique in the market for giving repeatedly fast response to low dew points.

Chilled Mirror Instruments

Chilled Mirror is a fundamental measuring technology offering the user exceptionally accurate, reliable and repeatable measurements from trace moisture to high humidity. Michell offers a range of instruments based on a rugged sensor design that is equally suitable for installation in demanding process environments or for use as an accurate reference instrument in a National Standards Laboratory.

Process Analysers

Michell's range of analyzers is specifically designed to provide reliable online measurement in process applications such as dedicated water and hydrocarbon dew-point determination in natural gas. Three sensing technologies are used: the Ceramic Impedance sensor for measurements in gas and liquid phase; Quartz Crystal Microbalance for trace moisture in process gases and the Dark Spot Chilled Mirror for hydrocarbon dew point.

Oxygen Analyzers

Michell brings you the very latest technologies in oxygen measurement, designed to give years of reliable and accurate service in laboratory, process and flue gas applications. From instruments featuring a unique sealed reference zirconia sensor to a transmitter with the latest generation thermo-paramagnetic oxygen technology, all Michell oxygen analyzers are available in a range of different configurations.

Relative Humidity Instruments

Michell's own RH sensing technology provides excellent resolution, long term stability and speed of response. We offer a wide range of humidity and temperature measuring sensors and instruments, including relative humidity transmitters, humidity and temperature transmitters as well as handheld indicators. The humidity generator range includes the most stable humidity generator on the market.



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Michell Instruments adopts a continuous development programme which sometimes necessitates specification changes without notice.

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