



Using Cooled Mirror Hygrometers as reference instruments in Climatic Chambers

Application Background

Controlled environmental chambers are used in a number of test, research and development applications where defined temperature and humidity conditions are required. Applications for humidity chambers can include component failure condition testing, to find the extremes of a components performance range, or to provide standardized conditions for evaluation of materials, heat exchange and refrigeration equipment. They are also widely used in the automotive, pharmaceutical and paper industries. They can vary in size widely, from small chambers for testing electronic components, to very large arrangements for testing industrial or transport equipment. They can also come in the form of controlled environment storage vaults for valuable and/or delicate items.



Optidew Display

Humidity and temperature probes are built into climatic chambers in order to provide control feedback for the switching of the condition generation devices (saturator, dryer, heaters, refrigerators etc). These probes are usually selected for their response speed and repeatability, rather than their accuracy. It is frequently important, with regards to many different testing applications, to verify the temperature and humidity conditions of the chamber. This instrument needs to provide the 'real' values of the climate inside; it does not always need to respond as quickly as the control probes. It does, however, need to be robust enough to withstand the conditions which are common in climatic testing. For this reason low cost humidity probes are not suited to this application, and instruments using robust, repeatable technology, such as cooled mirror are more suited to this environment.

Measurement Technique

The Optidew High Performance Dew-Point Transmitter and S8000 Remote Precision Hygrometer work on the proven, fundamental optical dew-point measurement principle, giving unmatched and drift-free long-term performance. A wide measurement range is available, from the equivalent of <math><0.5</math> to 100 %RH at ambient temperatures from -40 to +90°C. Optidew provides two linear 4-20mA outputs in addition to serial communications, allowing set-up and monitoring by a suitable computer, PLC system or via specific Optidew logging software. An adjustable volt-free contact alarm means that Optidew can be used for direct process control. An optional high



S8000 Remote



definition alphanumeric display provides local indication of the measured humidity. The S8000 Remote covers the same wide operating range, but with a dew-point accuracy of $\pm 0.1^{\circ}\text{C}$. It also offers a 3rd configurable analogue output and MODBUS RTU communications. A high temperature sensor has been developed to meet the rigorous demands of testing taking place at the extremes of the temperature and humidity envelope. The revised construction of the sensor allows it to provide accurate, repeatable and reliable measurements at temperatures up to 130°C .

Reference Users

British Aerospace, Consumer Research Association, Ministry of Defence, Vötsch, Weiss Technik GmbH, MIRA

