

Hygrometers, thermohygrographs, electronic hygrometers

Hygrometers are instruments used to measure the amount of water in the air and have been around since the mid 1700s. The ways to actually do the measuring have evolved since then so that today in addition to the hair hygrometer, and thermohygrographs electronic hygrometers are used. Very inexpensive hygrometers are used as barometers in meteorology to monitor and predict weather changes, however this instruments are not accurate enough for museums and art galleries.

Museums and art galleries use very accurate hygrometers to monitor the amount of moisture in the indoor environment over a long period of time. Most museums monitor these conditions 24 hours a day since the wrong moisture level can damage valuable paintings and other works of art. They tend to use the more accurate psychrometers and electronic hygrometers.

Temperature, expressed in degrees Celsius (°C) or Fahrenheit (°F), and humidity, measured in %RH are closely related, and are often measured with one instrument.

A commonly used instrument is the whirling or aspirated hygrometer (also called *psychrometer*). Two thermometers, a wet bulb and a dry bulb, are used to measure the temperature and calculate the humidity. Although the measurement is very accurate, human error during use and calculation often give misleading results.

Other instruments and aids are **Thermohygrographs, dial hygrometers, electronic hygrometers** and **humidity indicator cards**. Thermohygrographs and dial hygrometers measure the temperature with a bi-metallic coil and the humidity with a bundle of human hair that expands and contracts depending on its moisture content. These instruments are best left in one place, as moving them about may upset the calibration. Electronic hygrometers have an electronic sensor, which is less vulnerable to movement. Most of these instruments can respond relatively quickly to changing conditions and are particularly useful to carry around for spot-readings. Humidity indicator cards have patches, impregnated with cobalt chloride, which change color at a certain humidity level. The cards give an indication of humidity levels, but they are less accurate than the instruments mentioned above. They can be useful to monitor the conditions

inside a display case. The thermohygrograph is the only instrument that records readings and that can therefore be used to monitor conditions continuously. All other instruments can be used to take spot readings of current values. Spot-readings taken at very frequent intervals (every 30 minutes) can produce results similar to continuous recordings, and electronic data logging systems make use of this principle.

Newer electronic hygrometers such as the TV2 or [Master Thermometer](#) can accurately record the temperature and humidity while at the same time creating a permanent record of the temperature/RH, which is very important for museums and art galleries to maintain.