

# Calibration & Test Equipment

Met One Instruments provides equipment for the field calibration or audits of our sensors and systems. These devices allow the user to verify the compliance of the sensor to specifications, or requirements by the EPA, NRC and other agencies. Test fixtures and calibration equipment is available for a majority of the instruments and sensors. For special measurements such as solar radiation we recommend the purchase of another sensor for comparison testing using co-location of sensors.

## Wind Speed and Direction

Typical field measurements of wind sensors requires the following test equipment:

1. Starting threshold of the sensor is determined by measuring the starting torque of the sensor. Bad bearings cause higher than normal torque values and can effect the accuracy of the instrument. For torque measurement and depending on the sensor, Models 050, 051, and 052 are used. The Models 935000 and 935010 Torque Watch can also be used for direct measurement of the sensor torque value.



**050 Torque Wheel**

2. Wind Speed Sensor or System output test can be performed by rotating the shaft of the sensor at a know rpm value. This is directly converted into an equivalent wind speed. This is normally done using a synchronous motor that is based on the frequency of the power lines (60 or 50 Hz). The Models 049C-1 and 049C-2 provide 300 or 600 rpm shaft output for connection to the wind speed



**049 Wind Speed Calibrator**

sensor. When operated from 50 Hz the output is 250 and 500 rpm. They work directly with all sensors except the 034A/B which requires an additional 6666 Adapter. The Model 053 wind speed calibrator uses a digitally controlled motor that has an output of from 100 to 10,000 rpm, it is battery or AC powered.

- Adapters are available for all Met One Sensors.
3. Wind Direction Sensor and System linearity can be tested using a precision 360° measurement fixture and pointer. The 040, 044-1, 044-2 fit the 020, 023, and 024 Wind Direction Sensors. The 6986 works with the 034A/B Wind Sensor.
  4. Correct alignment of the direction sensor to TRUE North is a key requirement of each station.

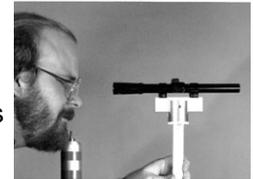


**044-2 Linearity Fixture**



**Compass 820510**

This measurement is made using either a surveyed marker that has been put at a location that is TRUE North of the sensor, or by determining magnetic North and then using the declination value for the specific part of the country to find TRUE North. An orientation compass such as the 820510 is recommended for it's accuracy and ease of use. For surveyed or identified markers at a distance from the sensor the 042, OF-201 and 17-50 are used for the different type of wind direction sensor mountings.



**Typical Sighting Fixture**

## Barometric Pressure

Checks of the barometric pressure can be made by comparison with a mercury barometer, or from another local source of absolute pressure.



**Hand Held Barometer And Altimeter**

For multipoint calibrations a laboratory grade pressure source and measuring equipment is required. For field verification of measurement the 410005 Portable hand held barometer/altimeter can be used to verify the sensor output. Alternately a second barometer that is of a comparable type as the installed barometer can be used

to verify calibration by performing a simple comparison between the two barometers.



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## Temperature

For field applications, a two point measurement is made comparing a reference thermometer to the sensor under test. The most common two point checks being done at 0° C (Ice Point) and at the local ambient or some raised temperature. The model 5472 Thermal Mass is used as stabilizer to maintain a constant temperature either at ice point or some elevated temperature. Because of the large mass, it will remain at a stable temperature making comparisons of temperature easier. It also provides a tool to be able to test the temperature portion of the 083 combined temperature and humidity sensor. The unit can hold the probe and a reference thermometer.



**Thermometer 790991**

come packaged in a felt lined case to protect the precision glass thermometer when it is not being used. Each thermometer includes an NIST calibration sheet.

A simple NIST calibration Glass Thermometer with a temperature range that covers -8° to +32° C and has 0.1° divisions, this works well for the most common measurement applications. The Model 790991 thermometer, will

## Humidity

For field applications, a two point measurement can be made using the Model 3226 Humidity Calibrator. It uses the operating principle on the fact that a saturated salt solutions generates a certain relative humidity in the air above it. The reading of the humidity probe or transmitter can then be checked for



**Calibrator Model 3226**

proper operation or adjustment. This method is generally accepted and a reliable method to calibrate humidity instruments. Two or three salt solutions can be used and are chosen according to the application. The calibrator also includes a thermometer which is used for measuring the temperature during the calibration. It can also be used for checking the temperature measurement accuracy of the sensor. The dual bath calibrator is a Model 3226 and the three bath calibrator is a Model 3226-1. The unit comes with salts for 12% and 75% test calibrations. Others are available:

Part nr	Description	Bath Calibration
60370	NaCl (Sodium Chloride)	75%
60371	LiCl (Lithium Chloride)	12%
60372	K <sub>2</sub> CO <sub>3</sub> (Potassium Carbonate)	44%
60373	MgCl <sub>2</sub> (Magnesium Chloride)	33%