

Some General Information about Psychrometers

Psychrometers are measuring instruments designed to determine the **relative humidity** of the atmosphere in the vicinity of the instrument. This measurement principle is one of the most accurate in humidity measurement technology.

The humidity value is calculated from the temperature difference (psychrometric difference) between two different thermometers.

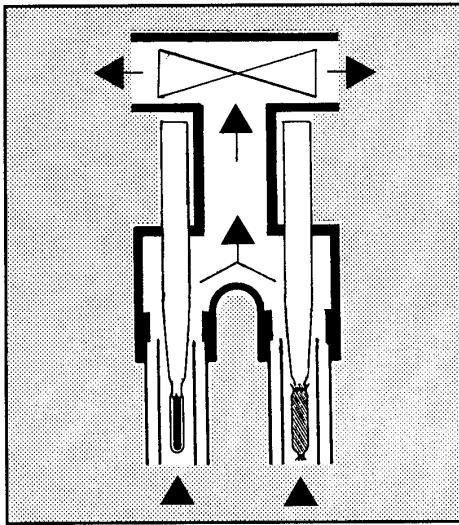
The first thermometer measures the dry ambient temperature, the second thermometer measures the temperature of a moistened thermometer. Through the evaporation of water, evaporation heat is drawn off the wet thermometer until a balance between the heat which has been drawn off and the heat from the surrounding air has been attained. This is the wet temperature which is lower than the dry. The temperature of the *wet thermometer* decreases with increasing evaporation, i.e. the air is drier. Both thermometers are ventilated. The most accurate results are attained when an air velocity of at least 2 m/s prevails around the thermometers.

The difference between the two temperatures is entered into the "psychrometric formula" which is then used to calculate the relative humidity. In the enclosed "psychrometric table", the relative humidity can be determined with the help of the two parameters.

Technical Data:

Temp. Measuring Range	: -35 ... +40 Cels.
Thermometer Graduation	: 0,2 Cels. degree
Humidity Measuring Range	: 100 % rel. humidity
Resolution (Table):	: 2% rel. humidity (1% rel. humidity readable)
Measuring Period (≥ 2 m/s)	: approx. 8 min.
Weight	: 3,5 kg

How the Psychrometer Works



The psychrometer consists of 2 thermometers, which together with their thermometer bulbs, are situated in a radiation tube and in an intake tube. This intake tube is connected with a central intake tube which has a ventilator at its other end.

The ventilator draws the air through the central tube and through the two intake tubes with the radiation protection. The air moves past the two thermometer bulbs at a minimum speed of 2 m/s.

The one thermometer is covered with a tightly fitted textile wick which can be moistened when measurements are to be taken.

The air flowing past the temperature bulbs guarantees quick temperature adjustment and draws the evaporation heat off the moistened wick.

Taking Measurements

1. Fill the moistening device with distilled or clean water.
2. Set the moistening device up so that the glass tube is pointing upwards and press the water out up to the marking with the help of the rubber balloon. Now seal off the lower end with the clamp.
3. Insert the water-filled moistening device from below into the protective tube marked in black until it clicks into place, thus moisten the wick.

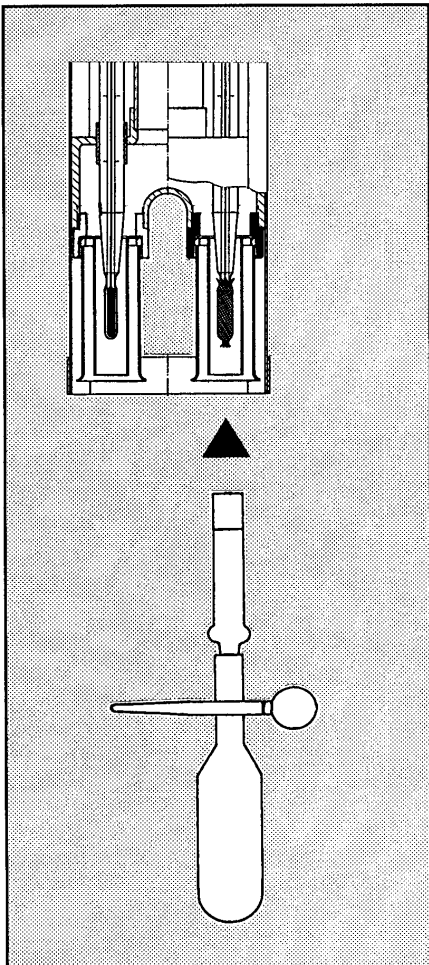
Remove the moistening device

4. Wind up the ventilator completely.
5. Wait 3...4 minutes, read the thermometer and note the values.
6. Check the psychrometric table for the relative humidity value.
Bear in mind whether water or ice is being measured..

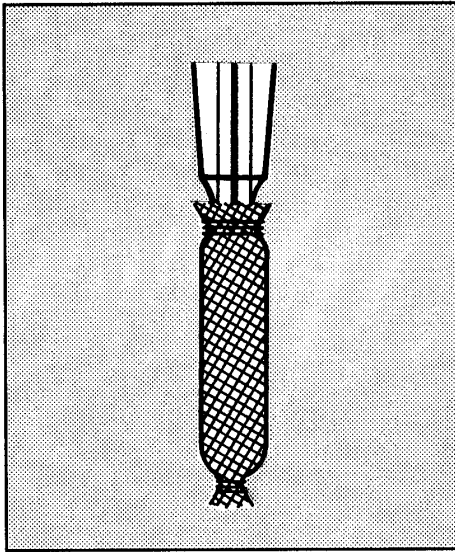
Example:

dry temperature	: 60 cels. degree
wet temperature	: 48 cels. degree
psychrometric difference	: 12 cels. Degree

Value **52% relative humidity**



Changing the Wick



1. Remove the ventilator by rotating it to the left.
2. Remove the thermometer with the black ring around it.
3. Cut off the old wick.
4. Pull the new wick up to about 3 mm over the neck (recess) of the thermometer bulb and bind it off with thread (recommendation: wind the thread around it 3 x).
5. Pull the wick downwards so that it really fits tightly and bind it off directly below the thermometer bulb (as described in point 4). The wick must fit very snugly. Cut the rest off below the lower tie-off point.
6. Re-insert the thermometer in reverse order and screw the ventilator back into place.

Some Important Points to Note to Avoid Measurement Errors

- Make sure that there are no objects in the immediate vicinity of the intake openings whose temperatures or humidity deviates significantly from the temperature or humidity of the air to be measured. It is especially important to make sure that body heat and breath do not influence the intake openings. It is advisable not to exhale in the direction of the air intake openings when taking measurements. On the other hand radiation can not influence the measurements. Thus the instrument can be used to measure humidity in sunny places. It is advisable to hold or mount the instrument at approximately eye-level.
- The moistening sock must always be clean and must accordingly be replaced from time to time. The sock must be closed (tied off) at one end and must fit snugly.
- The thermometer bulbs must always be clean and free of dirt, dust etc.
- The ventilation velocity at the thermometer bulbs must be at least 2 m/sec. Always wind up the ventilator completely before measurement.
- If the air is in motion at the measuring site, then please make sure that you tilt the instrument in such a way that the intake openings are facing the wind.
- Accurate measurements under conditions of radiation can only be guaranteed if the surface of the instrument is still highly polished. If this is not the case, then it will be necessary to polish all the metal parts - especially the protective tubes on the thermometer bulbs - with a soft cloth - perhaps using a mild cleansing agent.

List of Spare Parts

Pos.	Description	Order No.
1	Winding key	502733
2	Aspirator, compl.	502710
3	Spring case, compl.	210015
4	Thermometer -10/60	502588
5	Insulating piece, white	502766
6	Insulating piece, black	502767
7	Insulating tube	502769
8	Protection tube, compl.	502779
9	Moistening Device	502675
10	Bottle of distilled water	502873
	Wick, 1 m long	502578
	Psychrometer Table	205211

