**Instructions for using the sling psychrometer**

AOS 330

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Sling psychrometers are the standard for accurately measuring ambient temperature and humidity. Every meteorologist should know how to use one correctly.

1. Inspect the cotton wick on the sling psychrometer and make sure that it is in good condition and firmly in contact with the thermometer bulb. A psychrometer with a yellowed or frayed wick will not give an accurate reading, and the wick should be replaced. Do not touch the wick with your fingers, because contaminants will affect the accuracy. Also, check for a separated mercury column.

2. Thoroughly saturate the wick with *distilled* water. If the water beads up and does not easily soak in, the wick should be replaced.

3. Face into the wind (if any) and begin swinging the psychrometer at a steady, comfortable pace (about 2 turns per second is good). *Be extremely careful that you don't strike the psychrometer on a nearby table, railing, or other obstruction!* Also, keep it far enough from your body that you don't pick up your own body heat.

4. After about 1 minute, stop and check the wet-bulb temperature, quickly reading it to the nearest 1/10 degree (if you stop too long, the temperature will start to change). Then continue swinging the psychrometer for another minute or so. Check the wet-bulb temperature again and see whether it has changed from your previous reading. If it has, continue swinging for another minute and check again. Repeat as necessary. Your goal is to get the *lowest possible reading* out of the wet bulb thermometer (assuming that it started out near the dry air temperature).

*Important note: make sure that the wick does not become too dry. If it does, you will need to add another drop or two of distilled water and start over.*

5. *Carefully but quickly* read and record the final wet bulb and dry bulb temperatures to the nearest 0.1 degree, interpolating between tick marks as necessary.

6. Use whatever method is available (psychrometric computer, Skew-T diagram, or table) to compute the dewpoint and relative humidity.

Important Tips: *Most beginners do not take accurate psychrometer readings because of the following common mistakes:* (1) not ventilating the psychrometer long enough to reach equilibrium; (2) not getting the wick wet enough, or letting it dry out; (3) holding it too close to the body or taking too long to read the thermometers; (4) touching the bulb ends with the hands while reading; (5) not facing into the breeze. *Every one of these mistakes usually leads to a wet-bulb temperature reading that is too warm!* Compare your readings with the instructor's and see how close you are!

**Instructions for using the psychrometric computer**

If you are using the psychrometric computer (circular slide rule) to compute dewpoint and temperature from your dry-bulb and wet-bulb readings, follow this procedure.

1. If your readings are in degrees Celsius, you will have to convert them to Fahrenheit for this calculation. Use the formula

$$[^\circ F] = 32 + (9/5 \times [^\circ C])$$

2. Subtract the wet-bulb temperature $T_w$ from the dry-bulb temperature $T$ to get the *wet-bulb depression* $D$ in degrees Fahrenheit.

3. Find the zero index on the outer ring of the movable disk and point it at the wet-bulb temperature on the outer-most scale.

4. Look clockwise from the zero until you find the wet-bulb depression $D$. Read the dewpoint temperature $T_d$ from the outermost scale.

5. To compute the relative humidity, find 100% on the innermost scale and point it at the dry-bulb temperature $T$. Then follow the temperature scale counterclockwise until you find the dewpoint $T_d$. Read the corresponding relative humidity on the innermost scale.

6. If required, convert your dewpoint temperature back to Celsius using the following formula:

$$[^\circ C] = 5/9 \times ([^\circ F] - 32)$$