Measuring Wet Bulb Temperature Without a Wet Bulb Thermometer: Slide Rule Method

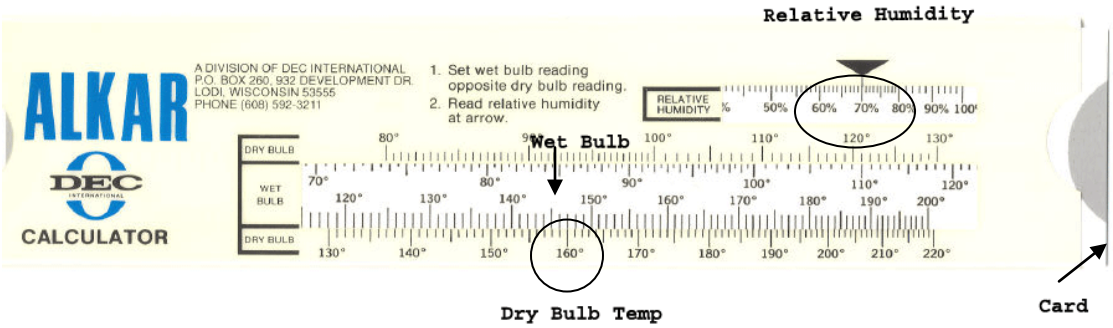
If you are smoking or drying meat, there are several parameters which will help you monitor your process: **dry bulb temperature**, **wet bulb temperature**, and **relative humidity**.

Dry bulb temperature, usually referred to as air temperature, is the air property that is most commonly measured. When people refer to the temperature (heat content) of the air, they are normally referring to the dry bulb temperature. It is called "dry bulb" because the air temperature is indicated by a thermometer not affected by the moisture of the air. The temperature is usually given in degrees Celsius (°C) or degrees Fahrenheit (°F).

Wet bulb temperature is the temperature indicated by a moistened thermometer bulb exposed to the air flow. Wet bulb thermometer can be measured using a thermometer with the bulb wrapped in wet muslin. (See **Field-Expedient Wet Bulb Thermometer** for information on constructing a wet bulb thermometer.) A wet bulb thermometer measures the extent of cooling as moisture dries from a surface (evaporative cooling). The wet bulb temperature is always lower than the dry bulb temperature except when there is 100% relative humidity, making the wet bulb temperature a more accurate measurement of product temperature.

Relative humidity is the amount of water vapor present in the air, expressed in relation to full saturation or 100%.

To determine wet bulb temperature without a wet bulb thermometer using the **slide rule method**, you must know the **dry bulb temperature** (regular thermometer or probe) and **% relative humidity** obtained from a hygrometer. Various types of hygrometers, some with data storage and download capabilities, are available commercially.



There are 3 easy steps to the slide rule method:

1. Indicate the **% relative humidity** on the slide rule (upper scale) by moving the inserted card.
2. Find the measured **dry bulb temperature** on the lower scale.
3. The corresponding **wet bulb temperature** can be read on the interior scale.

For example, in the image above, a dry bulb temperature of 160°F at 70% relative humidity yields a wet bulb temperature of 147°F.

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