**Wet-bulb temperature**

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The **wet-bulb temperature** is the [temperature](http://en.wikipedia.org/wiki/Temperature) a parcel of air would have if it were cooled to saturation (100% [relative humidity](http://en.wikipedia.org/wiki/Relative_humidity)) by the [evaporation](http://en.wikipedia.org/wiki/Evaporation) of water into it, with the [latent heat](http://en.wikipedia.org/wiki/Latent_heat) being supplied by the parcel.[[1]](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_note-1) An [actual wet-bulb thermometer](http://en.wikipedia.org/wiki/Wet-bulb_temperature#Temperature_reading_of_wet-bulb_thermometer) indicates a temperature close to the true (thermodynamic) wet-bulb temperature. The wet-bulb temperature is the lowest temperature that can be reached under current ambient conditions by the evaporation of water only; it is the temperature felt when the skin is wet and exposed to moving air. Wet-bulb temperature is largely determined by both actual air temperature ([dry-bulb temperature](http://en.wikipedia.org/wiki/Dry-bulb_temperature)) and humidity, the amount of moisture in the air.

The thermodynamic wet-bulb temperature is the minimum temperature which may be achieved by purely [evaporative cooling](http://en.wikipedia.org/wiki/Evaporative_cooling) of a water-wetted (or even ice-covered), ventilated surface.

For a given parcel of air at a known pressure and [dry-bulb temperature](http://en.wikipedia.org/wiki/Dry-bulb_temperature), the thermodynamic wet-bulb temperature corresponds to unique values of [relative humidity](http://en.wikipedia.org/wiki/Relative_humidity), [dew point temperature](http://en.wikipedia.org/wiki/Dew_point_temperature), and other properties. The relationships between these values are illustrated in a [psychrometric chart](http://en.wikipedia.org/wiki/Psychrometric_chart).

For "dry" air, air that is less than saturated (i.e., air with less than 100 percent relative humidity), the wet-bulb temperature is lower than the dry-bulb temperature due to evaporative cooling. The greater the difference between the wet and dry bulb temperatures, the drier the air and lower the relative humidity. The dew point temperature is the temperature at which the ambient air must cool to reach 100% relative humidity where condensate and rain form; and conversely, the wet-bulb temperature rises to converge on the dry bulb temperature.

Cooling of the human body through perspiration is inhibited as the wet-bulb temperature (and absolute humidity) of the surrounding air increases in summer. Other mechanisms may be at work in winter if there is validity to the notion of a "humid" or "damp cold."

Lower wet-bulb temperatures that correspond with drier air in summer can translate to energy savings in air-conditioned buildings due to:

1. Reduced dehumidification load for ventilation air
2. Increased efficiency of [cooling towers](http://en.wikipedia.org/wiki/Cooling_towers)

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**Thermodynamic wet-bulb temperature (adiabatic saturation temperature)**

The **thermodynamic wet-bulb temperature** is the temperature a volume of air would have if cooled adiabatically to saturation by evaporation of water into it, all latent heat being supplied by the volume of air.

The temperature of an air sample that has passed over a large surface of liquid water in an insulated channel is the thermodynamic wet-bulb temperature—it has become saturated by passing through a constant-pressure, ideal, adiabatic saturation chamber.

Meteorologists and others may use the term "isobaric wet-bulb temperature" to refer to the "thermodynamic wet-bulb temperature". It is also called the "adiabatic saturation temperature", though it should be pointed out that meteorologists also use "adiabatic saturation temperature" to mean "temperature at the saturation level", i.e. the temperature the parcel would achieve if it expanded adiabatically until saturated.[[2]](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_note-2)

It is the thermodynamic wet-bulb temperature that is plotted on a [psychrometric chart](http://en.wikipedia.org/wiki/Psychrometric_chart).

The thermodynamic wet-bulb temperature is a [thermodynamic property](http://en.wikipedia.org/wiki/Thermodynamic_properties) of a mixture of air and water vapor. The value indicated by a simple wet-bulb thermometer often provides an adequate approximation of the thermodynamic wet-bulb temperature.

For an accurate wet-bulb thermometer, "the wet-bulb temperature and the adiabatic saturation temperature are approximately equal for air-water vapor mixtures at atmospheric temperature and pressure. This is not necessarily true at temperatures and pressures that deviate significantly from ordinary atmospheric conditions, or for other gas–vapor mixtures."[[3]](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_note-3)

**Temperature reading of wet-bulb thermometer**

[](http://en.wikipedia.org/wiki/File:Wetdryhygrometer.JPG)

[http://bits.wikimedia.org/static-1.22wmf16/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Wetdryhygrometer.JPG)

A Wet Dry [Hygrometer](http://en.wikipedia.org/wiki/Hygrometer) featuring a wet-bulb thermometer

[](http://en.wikipedia.org/wiki/File:Sling_psychrometer.JPG)

[http://bits.wikimedia.org/static-1.22wmf16/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Sling_psychrometer.JPG)

A sling psychrometer. The sock is wet with distilled water and whirled around for a minute or more before taking the readings.

Wet-bulb temperature is measured using a [thermometer](http://en.wikipedia.org/wiki/Thermometer) that has its bulb wrapped in cloth—called a *sock*—that is kept wet with distilled water via [wicking](http://en.wikipedia.org/wiki/Capillary_action) action. Such an instrument is called a *wet-bulb thermometer.* A widely used device for measuring wet and dry bulb temperature is a *sling psychrometer*, which consists of a pair of mercury bulb thermometers, one with a wet "sock" to measure the wet-bulb temperature and the other with the bulb exposed and dry for the dry-bulb temperature. The thermometers are attached to a swivelling handle which allows them to be whirled around so that water evaporates from the sock and cools the wet bulb until it reaches [thermal equilibrium](http://en.wikipedia.org/wiki/Thermal_equilibrium).

An actual wet-bulb thermometer reads a slightly different temperature than the thermodynamic wet-bulb temperature, but they are very close in value. This is due to a coincidence: for a water-air system the [psychrometric ratio](http://en.wikipedia.org/wiki/Psychrometrics) happens to be ~1, although for systems other than air and water they might not be close.

To understand why this is, first consider the calculation of the thermodynamic wet-bulb temperature: in this case, a stream of air with less than 100% relative humidity is cooled. The heat from cooling that air is used to evaporate some water which increases the humidity of the air. At some point the water vapour in the air becomes saturated (and has cooled to the thermodynamic wet-bulb temperature). In this case we can write the following:


(H_\mathrm{sat} - H_0) \cdot \lambda = (T_0 - T_\mathrm{sat}) \cdot c_\mathrm{s}


where H_0is the initial water content of the air on a mass basis, H_\mathrm{sat}is the saturated water content of the air, \lambdais the latent heat of water, T_0is the initial air temperature, T_\mathrm{sat}is the saturated air temperature and c_sis the heat capacity of the air.

For the case of the wet-bulb thermometer, imagine a drop of water with air of less than 100% relative humidity blowing over it. As long as the vapor pressure of water in the drop is more than the partial pressure of water in the air stream, evaporation will take place. Initially the heat required for the evaporation will come from the drop itself since the fastest moving water molecules are most likely to escape the surface of the drop, so the remaining water molecules will have a lower average speed and therefore a lower temperature. If this were the only thing that happened, then the drop would cool until the following was true:


P_\mathrm{sat}(T_\mathrm{drop}) = P_\mathrm{vapor}


where P_\mathrm{sat}is the saturation pressure of the water in the drop and is a function of the drop temperature and P_\mathrm{vapor}is the partial pressure of water in the vapor phase. If the air started bone dry and was blowing sufficiently fast then P_\mathrm{vapor}would be 0 and the drop could get infinitely cold. Clearly this doesn't happen. It turns out that as the drop cools, convective heat transfer begins to occur between the warmer air and the colder water. In addition, the evaporation does not occur instantly, but instead depends on the rate of convective mass transfer between the water and the air. At a certain point the water cools to a point where the heat carried away in evaporation is equal to the heat gain through convective heat transfer. At this point the following is true:


(H_\mathrm{sat} - H_0) \cdot \lambda \cdot k' = (T_0 - T_\mathrm{wb}) \cdot h_\mathrm{c}


where (H_\mathrm{sat} - H_0)is now the driving force for mass transfer, k' is the mass transfer coefficient (with English units of lb/(h⋅ft2)), h_\mathrm{c}is the heat transfer coefficient and (T_0 - T_\mathrm{wb})is the temperature driving force.

Now if this equation is compared to the thermodynamic wet-bulb equation, we can see that if the quantity \dfrac{h_\mathrm{c}}{k' c_\mathrm{s}} = 1(known as the psychrometric ratio) then  T_\mathrm{sat} = T_\mathrm{wb} 

Due to a coincidence, for air this is the case and the ratio is very close to 1.[[4]](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_note-4)

Experimentally, the wet-bulb thermometer reads closest to the thermodynamic wet-bulb temperature if:

* The sock is shielded from radiant heat exchange with its surroundings
* Air flows past the sock quickly enough to prevent evaporated moisture from affecting evaporation from the sock
* The water supplied to the sock is at the same temperature as the thermodynamic wet-bulb temperature of the air

In practice the value reported by a wet-bulb thermometer differs slightly from the thermodynamic wet-bulb temperature because:

* The sock is not perfectly shielded from radiant heat exchange
* Air flow rate past the sock may be less than optimum
* The temperature of the water supplied to the sock is not controlled

At relative [humidities](http://en.wikipedia.org/wiki/Humidity) below 100 percent, water [evaporates](http://en.wikipedia.org/wiki/Evaporates) from the bulb which cools the bulb below ambient temperature. To determine relative humidity, ambient temperature is measured using an ordinary thermometer, better known in this context as a [dry-bulb thermometer](http://en.wikipedia.org/wiki/Dry-bulb_temperature). At any given ambient temperature, less relative humidity results in a greater difference between the dry-bulb and wet-bulb temperatures; the wet-bulb is colder. The precise relative humidity is determined by reading from a [psychrometric chart](http://en.wikipedia.org/wiki/Psychrometrics#Psychrometric_charts) of wet-bulb versus dry-bulb temperatures, or by calculation.

[Psychrometers](http://en.wikipedia.org/wiki/Psychrometer) are instruments with both a wet-bulb and a dry-bulb thermometer.

A wet-bulb thermometer can also be used outdoors in sunlight in combination with a *globe thermometer* (which measures the incident [radiant temperature](http://en.wikipedia.org/wiki/Mean_radiant_temperature)) to calculate the [Wet Bulb Globe Temperature](http://en.wikipedia.org/wiki/Wet_Bulb_Globe_Temperature) (WBGT).

**Adiabatic wet-bulb temperature**

The **adiabatic wet-bulb temperature** is the temperature a volume of air would have if cooled adiabatically to saturation and then compressed adiabatically to the original pressure in a moist-adiabatic process (AMS Glossary). Such cooling may occur as air pressure reduces with altitude, as noted in the article on [lifted condensation level](http://en.wikipedia.org/wiki/Lifted_condensation_level).

This term, as defined in this article, may be most prevalent in meteorology.

As the value referred to as "thermodynamic wet-bulb temperature" is also achieved via an adiabatic process, some engineers and others may use the term "adiabatic wet-bulb temperature" to refer to the "thermodynamic wet-bulb temperature". As stated in another section, meteorologists and others may use the term "isobaric wet-bulb temperature" to refer to the "thermodynamic wet-bulb temperature".

"The relationship between the isobaric and adiabatic processes is quite obscure. Comparisons indicate, however, that the two temperatures are rarely different by more than a few tenths of a degree Celsius, and the adiabatic version is always the smaller of the two for unsaturated air. Since the difference is so small, it is usually neglected in practice."[[5]](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_note-5)

**Wet-bulb depression**

The **wet-bulb depression** is the difference between the dry-bulb temperature and the wet-bulb temperature. If there is 100% humidity, dry-bulb and wet-bulb temperatures are identical, making the wet-bulb depression equal to zero in such conditions.[[6]](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_note-engineeringtoolbox.com-6)

**Wet-bulb temperature and health**

Further information: [Effects of climate change on humans](http://en.wikipedia.org/wiki/Effects_of_climate_change_on_humans)

Living organisms can only survive within a certain temperature range. When the ambient temperature is excessive, humans and many animals cool themselves below ambient by [evaporative cooling](http://en.wikipedia.org/wiki/Evaporative_cooling) of [sweat](http://en.wikipedia.org/wiki/Sweat) (or other aqueous liquid; [saliva](http://en.wikipedia.org/wiki/Saliva) in dogs, for example); this helps to prevent potentially fatal [hyperthermia](http://en.wikipedia.org/wiki/Hyperthermia) due to heat stress. The effectiveness of evaporative cooling depends upon humidity; wet-bulb temperature, or more complex calculated quantities such as [Wet Bulb Globe Temperature](http://en.wikipedia.org/wiki/Wet_Bulb_Globe_Temperature) (WBGT) which also takes account of [solar radiation](http://en.wikipedia.org/wiki/Solar_radiation), give a useful indication of the degree of heat stress, and are used by several agencies as the basis for heat stress prevention guidelines.

A sustained wet-bulb temperature exceeding 35 °C is likely to be fatal even to fit and healthy people, unclothed in the shade next to a fan; at this temperature we switch from cooling the skin (losing heat to the environment), to warming it.[[7]](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_note-pnas-7)

**See also**

* [Wet-bulb potential temperature](http://en.wikipedia.org/wiki/Wet-bulb_potential_temperature)
* [Dry-bulb temperature](http://en.wikipedia.org/wiki/Dry-bulb_temperature)
* [Dew point](http://en.wikipedia.org/wiki/Dew_point)
* [Atmospheric thermodynamics](http://en.wikipedia.org/wiki/Atmospheric_thermodynamics)

**References**

* 1. [**Jump up ^**](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_ref-1) Oxford Reference, A Dictionary of Weather, [ISBN 978-0-19-954144-7](http://en.wikipedia.org/wiki/Special:BookSources/9780199541447)
  2. [**Jump up ^**](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_ref-2) <http://amsglossary.allenpress.com/glossary/search?p=1&query=adiabatic+saturation+temperature&submit=Search> [AMS Glossary]
  3. [**Jump up ^**](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_ref-3) VanWylen, Gordon J; Richard E. Sonntag (1973). *Fundamentals of Classical Thermodynamics*. John Wiley and Sons. p. 448.
  4. [**Jump up ^**](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_ref-4) <http://www.probec.org/fileuploads/fl120336971099294500CHAP12_Dryers.pdf>, accessed 20080408
  5. [**Jump up ^**](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_ref-5) NWSTC Remote Training Module; SKEW T LOG P DIAGRAM AND SOUNDING ANALYSIS; RTM - 230; National Weather Service Training Center; Kansas City, MO 64153; July 31, 2000
  6. [**Jump up ^**](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_ref-engineeringtoolbox.com_6-0) <http://www.engineeringtoolbox.com/dry-wet-bulb-dew-point-air-d_682.html>
  7. [**Jump up ^**](http://en.wikipedia.org/wiki/Wet-bulb_temperature#cite_ref-pnas_7-0) [An adaptability limit to climate change due to heat stress, SC Sherwood and M Huber, Proceedings of the National Academy of Sciences of the United States of America (PNAS) May 25, 2010 vol. 107 no. 219552-9555](http://www.pnas.org/content/107/21/9552.full)

**External links**

* [Wet-bulb chart for snow making (Fahrenheit)](http://www.snowathome.com/pdf/wet_bulb_chart_fahrenheit.pdf)
* [Indirect evaporative cooler cools below wet-bulb](http://www1.eere.energy.gov/femp/pdfs/tir_coolerado.pdf)
* [On-line calculator returns wet-bulb temperature for given dry bulb and relative humidity](http://www.4wx.com/wxcalc/rh.php)
* [Shortcut to calculating wet-bulb](http://www.theweatherprediction.com/habyhints/170/)

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