Dew point examples

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The dew point of a given body of air is the temperature to which it must be cooled to become saturated with water vapor. This temperature depends on the pressure and water content of the air. When the air is cooled below the dew point, its moisture capacity is reduced and airborne water vapor will condense to form liquid water known as dew.[1] When this occurs through the air"s contact with a colder surface, dew will form on that surface.[2]

The dew point is affected by the air"s humidity. The more moisture the air contains, the higher its dew point.[3]

When the temperature is below the freezing point of water, the dew point is called the frost point, as frost is formed via deposition rather than condensation.[4]In liquids, the analog to the dew point is the cloud point.

If all the other factors influencing humidity remain constant, at ground level the relative humidity rises as the temperature falls; this is because less vapor is needed to saturate the air. In normal conditions, the dew point temperature will not be greater than the air temperature, since relative humidity typically[5] does not exceed 100%.[6]

The dew point depends on how much water vapor the air contains. If the air is very dry and has few water molecules, the dew point is low and surfaces must be much cooler than the air for condensation to occur. If the air is very humid and contains many water molecules, the dew point is high and condensation can occur on surfaces that are only a few degrees cooler than the air.[8]

A high relative humidity implies that the dew point is close to the current air temperature. A relative humidity of 100% indicates the dew point is equal to the current temperature and that the air is maximally saturated with water. When the moisture content remains constant and temperature increases, relative humidity decreases, but the dew point remains constant.[9]

Increasing the barometric pressure raises the dew point.[10] This means that, if the pressure increases, the mass of water vapor per volume unit of air must be reduced in order to maintain the same dew point. For example, consider New York City (33 ft or 10 m elevation) and Denver (5,280 ft or 1,610 m elevation[11]). Because Denver is at a higher elevation than New York, it will tend to have a lower barometric pressure. This means that if the dew point and temperature in both cities are the same, the amount of water vapor in the air will be greater in Denver.

When the air temperature is high, the human body uses the evaporation of perspiration to cool down, with the cooling effect directly related to how fast the perspiration evaporates. The rate at which perspiration can

evaporate depends on how much moisture is in the air and how much moisture the air can hold. If the air is already saturated with moisture (humid), perspiration will not evaporate. The body"s thermoregulation will produce perspiration in an effort to keep the body at its normal temperature even when the rate at which it is producing sweat exceeds the evaporation rate, so one can become coated with sweat on humid days even without generating additional body heat (such as by exercising).

As the air surrounding one"s body is warmed by body heat, it will rise and be replaced with other air. If air is moved away from one"s body with a natural breeze or a fan, sweat will evaporate faster, making perspiration more effective at cooling the body, thereby increasing comfort. By contrast, comfort decreases as unevaporated perspiration increases.

A wet bulb thermometer also uses evaporative cooling, so it provides a good measure for use in evaluating comfort level.

Discomfort also exists when the dew point is very low (below around -5 ?C or 23 ?F).[citation needed] The drier air can cause skin to crack and become irritated more easily. It will also dry out the airways. The US Occupational Safety and Health Administration recommends indoor air be maintained at 20-24.5 ?C (68-76 ?F) with a 20-60% relative humidity,[12] equivalent to a dew point of approximately 4.0 to 16.5 ?C (39 to 62 ?F) (by Simple Rule calculation below).

Lower dew points, less than 10 ?C (50 ?F), correlate with lower ambient temperatures and cause the body to require less cooling. A lower dew point can go along with a high temperature only at extremely low relative humidity, allowing for relatively effective cooling.

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