



Climate Control

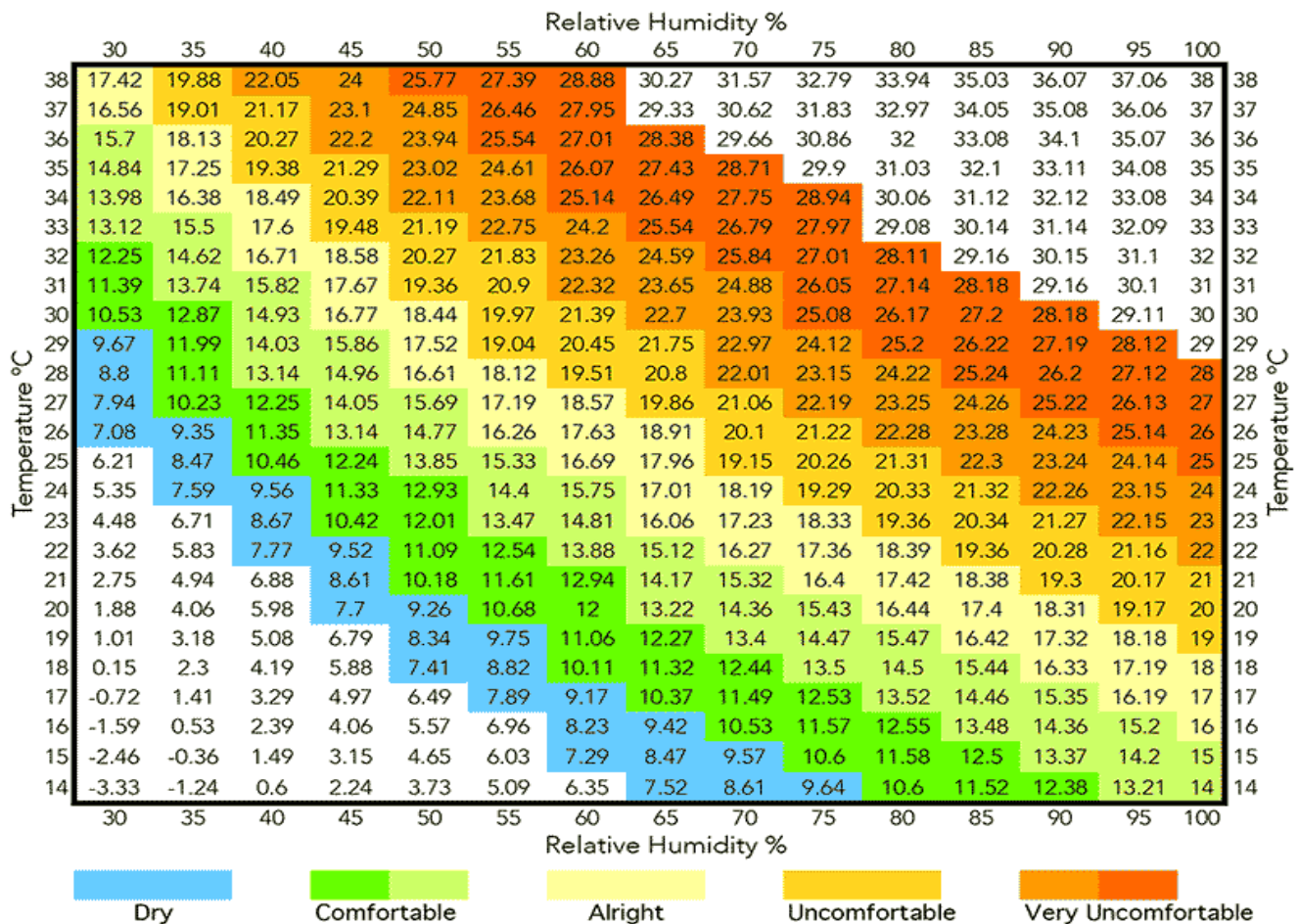
Air Conditioning and TheControl of Temperature, Relative Humidity and Dew Points

Our comfort at home depends on a combination of the humidity and temperature, what we know as climate control. We control these using our air conditioner which performs two functions, it lowers the temperature of the air and it reduces the amount of moisture (the humidity) of the air. The temperature and relative humidity are directly related in what is called the Dew Point. What is the Dew Point and how comfortable will we be in different levels of temperature and relative humidity?

See also:

- [Buying an air conditioner](#)
- [How an air conditioner works](#)
- [Types of air conditioners](#)
- [Inverter air conditioners](#)
- [Servicing and maintenance of air conditioners](#)
- [Air conditioner refrigerants](#)
- [Air Conditioner quality and reliability](#)
- [How large an air conditioner do you need?](#)
- [Air conditioner water heaters give you free hot water](#)
- [Building insulation](#)

Temperature, Relative Humidity and Dew Point



Humidity

As we all know humidity can be a big problem when you live in a hot climate. It grows bugs, it rots our woodwork, we get condensation on our walls, our clothes go mouldy in the wardrobe (leather is particularly vulnerable) and it can play havoc with electronic equipment and camera lenses. Leave a laptop or a smartphone for only a couple of weeks and they are often rendered about as useful as a three legged racehorse (I know someone who keeps betting on those).

Humidity also has a considerable effect on how comfortable we feel which is determined not only by the temperature but also by the humidity of the air around us. Remember those times when it doesn't seem very hot but we are dripping with sweat or other times when the air is cool but seems so dry that our lips start to dry up and crack. This is, in fact, all related to the balance of the temperature and humidity of the air, a balance that determines the "Dew Point".

Dew Point

So what is the Dew Point?

1. When we heat water up to 100°C it evaporates and turns into water vapour (yes we all know that). But water, of course, doesn't have to reach 100°C to evaporate. Water is trying to evaporate all the time thank goodness. When we wash the dishes we stack them up to dry and the water on them evaporates.

All that water has to do to evaporate is to collect enough heat from anything around it to change it from water into water vapour. As the water absorbs heat so it makes anything it is in contact with colder.

This is, of course, the natural way our bodies keep cool, when we get hot, we sweat, our bodies lash a bit of water out onto our skin which evaporates and cools us down.

2. Now as water evaporates and the water vapour mixes with the air the moisture content rises, the humidity of the air increases. Eventually there comes a point when the air can't hold anymore moisture, it is full, it is saturated. This is, of course, 100% humidity and no more water can evaporate.

This causes us a little bit of a problem because, when the air around us is fully saturated it can't take any more moisture so our sweat cannot evaporate, our bodies can't cool us down and we overheat. The higher the humidity level and the harder it is for us to sweat and to cool ourselves down.

Hot air Holds More water than Cold Air

3. There is something else we need to know - hot air can hold more water vapour than cold air.

If we heat the air up a bit it can hold more water vapour. Let us consider that we have a room that is at a temperature of 25°C and with 100% humidity. If we now heat the room up to 30°C the room can hold more water vapour and so the humidity is now less than 100%, it is in fact only at a humidity level of 74.63% and so more water can evaporate until once again it reaches 100%.

The level of humidity is directly related to the temperature of the air and so we call the humidity level "Relative Humidity".

4. Alright so once again we have a room at 100% humidity. Now if we cool the room down the opposite will happen, the air can't hold as much water vapour so some of the vapour must turn back into water, it condenses, and we end up with dew.

5. Now let us consider that the room is at 30°C with a 60% relative humidity. We cool the room down, the room can't hold as much water vapour so the humidity starts to rise. Eventually when we get down to a certain temperature (around 21°C) the relative humidity will reach 100%. This is a balancing point - if we raise the temperature the humidity will drop but if we reduce the temperature dew will form.

This balancing point is known as the "Dew Point" and we can calculate the Dew Point for any combination of air temperature and level of humidity.

If we want to live in a comfortable environment it is a good idea to manage the humidity as well as the temperature of the air. This is particularly important for people who run hotels or hire out villas.

Comfort Levels

Our body's natural built in temperature control involves 2 systems. If we are cold we burn energy to produce heat to heat ourselves up. If we are hot we perspire, we exude water which evaporates and causing cooling of our skin.

As we have said our body's ability to keep cool is dependant on the rate of evaporation which is directly affected by the relative humidity of the air around us.

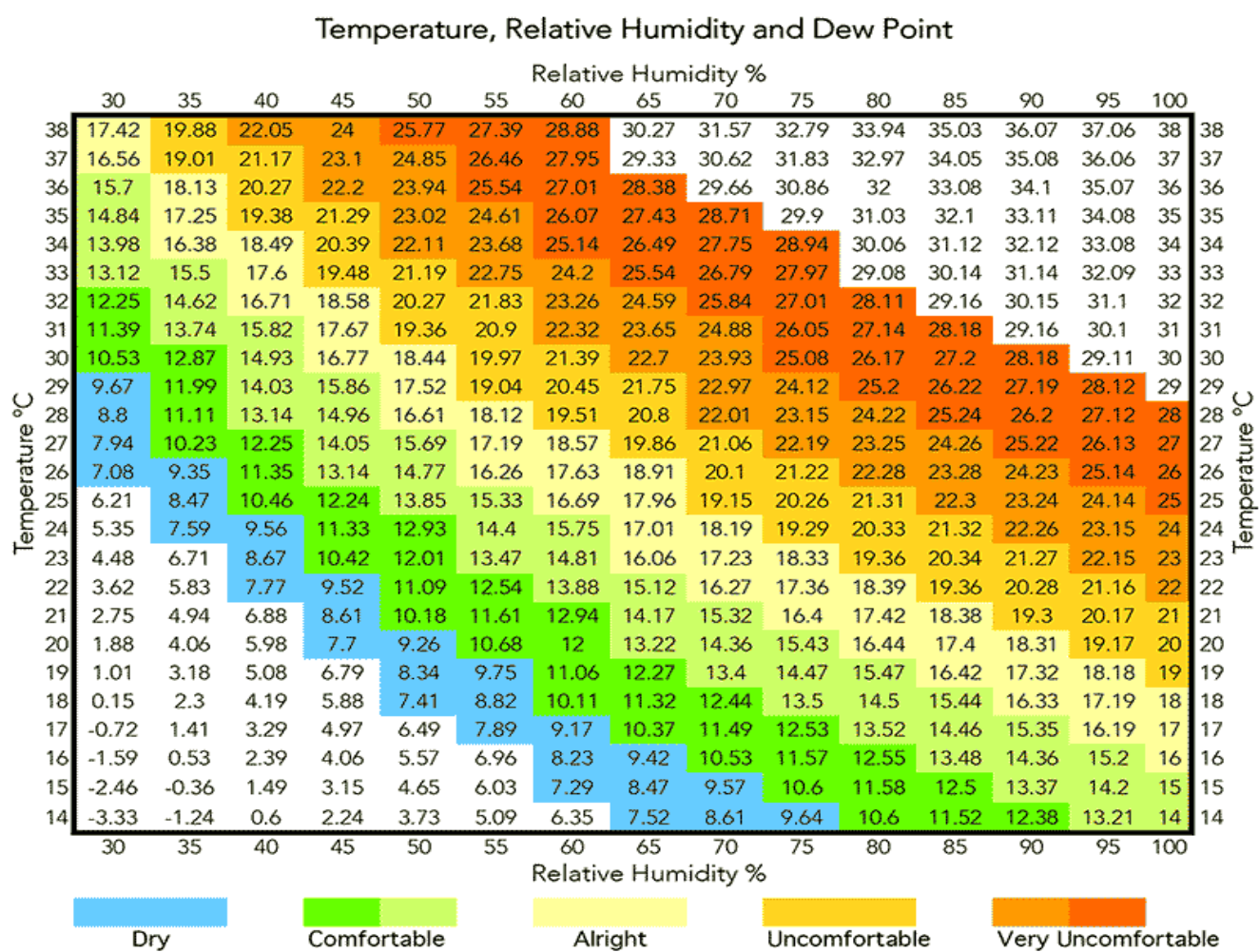
Water Vapour Rises

It is also useful to note that water vapour is lighter than other gases in the air which means that humid air tends to rise so as we perspire the air next to our bodies becomes more humid and it rises making way for new drier air to replace it, in effect we create our own mini breeze, a flow of rising air over our skin which carries away the moisture.

We can now see that breezes and fans work by driving a steady flow of drier air over our bodies which accelerates the evaporation of our perspiration and cools us down quicker. But we can also see that the closer we get to the dew point the less effective fans and breezes will be.

As we have said the dew point considers both the temperature and the relative humidity and we can determine how comfortable we will be at different dew points.

Chart of Relative Humidity, Temperature and Dew Points



NOTE: You can download the [full version of this chart here](#)

In the above table find the room temperature from the left hand column and the relative humidity column along the bottom, where these meet will give you the dew point. For example, at a temperature of 25°C and a relative humidity of 55%, the dew point is 15.33°C, this is in the light green zone. The light green colour tells us how comfortable this dew point should be.

Comfort levels of different dew points

- Below 10°C (the blue area) is dry, we might wake up with scratchy eyes and our lips may start to dry up and crack.
- A Dew Point of 10 to 15°C (green) is very comfortable.
- 15 to 18°C (light green) is still comfortable.
- 20°C (yellow) is alright.
- Once we get to 21 to 24°C (orange) we start getting uncomfortable.
- 24 to 26°C (red) is very uncomfortable.
- Over 26°C becomes severely uncomfortable and possibly deadly for asthma sufferers.

Notes:

- If you have lived on hot climates for many years or if you are sitting in a breeze or a fan you will probably be able to take a couple of colours higher before you start to feel uncomfortable.
- Guests from colder climates will probably prefer the green zones.

To be most comfortable we need to aim for a Dew Point of around 12°C when our natural temperature controls can work most effectively so, if the room temperature is 24°C, you will be most comfortable at a Relative Humidity of around 47%.

Measuring Humidity

To measure humidity you need a hygrometer, you can buy a low cost hygrometer online and there are many types to choose from. You can also download any number of dew point calculation apps for your smartphone.

Calculating the Dew Point

You can use the chart above or you can also download any number of dew point calculation apps for your smartphone.

We manage humidity by designing appropriate insulation and ventilation for our houses and through careful use of fans, air conditioners and dehumidifiers.

See also:

- [Buying an air conditioner](#)
- [How an air conditioner works](#)
- [Types of air conditioners](#)
- [Inverter air conditioners](#)
- [Servicing and maintenance of air conditioners](#)
- [Air conditioner refrigerants](#)
- [Air Conditioner quality and reliability](#)
- [How large an air conditioner do you need?](#)
- [Air conditioner water heaters give you free hot water](#)
- [Building insulation](#)

[Phil Wilson](#)

Copyright © Phil Wilson December 2016

This article, or any part of it, cannot be copied or reproduced without permission from the copyright owner.



Privacy Policy

Site last updated 7 March 2023 Copyright © Mr Fixit,
JI Bypass Ngurah Rai, Gg Penyu No 1, Sanur, Bali, Indonesia
WhatsApp:+62-8123-847-852 Tel: +62-81-558-000-860 or +62-(0)361-288-789