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Good Question: What's The Difference Between Dew Point And Humidity?

By Jason DeRusha July 17, 2012 at 10:51 pm Filed Under: Chris Shaffer, Dew Point, Good Question, Humidity, Jason DeRusha



MINNEAPOLIS (WCCO) — It's not too hard to find the words to describe the Twin Cities' weather over the past few days. "Sticky," said one [person](#). "Hot and steamy," said another. "Clammy," another said.

It's humid. But meteorologists rarely talk about relative humidity. Instead, they tend to discuss dew points. Why?

What's the difference between dew point and humidity?

They are both different measures of the water content of the air, but humidity has fallen out of favor by scientists because "it hinges on the word relative. It's so relative," said WCCO-TV chief meteorologist Chris Shaffer.

Relative humidity is the amount of moisture in the air compared to what the air can "hold" at that temperature, Shaffer said. The problem is, "warmer air can hold more water vapor," he said, so the relative humidity can give people a skewed sense of the sticky-factor.

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Dew point is a more [concrete](#) number, he said.

"I can tell you if dew point is 60 degrees you're gonna feel uncomfortable. If it gets to 70, you'll be very uncomfortable," Shaffer said.

Dew point is a [temperature](#) at which dew droplets would form. So if the dew point is 75, and the air temperature is 75, you'd see fog or dew.

But look what happens with relative humidity. Assume a constant dew point of 72: when the air temperature is 90, relative humidity is just 55 percent.

"That seems almost comfortable, but you walk out here and we're sweating," Shaffer said.

If it's 100 and the dew point is 72, relative humidity would be 40 percent.

In the [winter](#), you could have a 40 degree day with a dew point of 38, and relative humidity would be 93 percent.

"But who steps outside and says 'It's so humid!' Nobody, because it's so cool outside," Shaffer said.

So meteorologists prefer the consistent message that comes with dew point.

Many people think that moist, humid air is heavier than dry air. In fact, the opposite is true.

The average molecular mass of air (80 percent nitrogen, 20 percent oxygen, a mix of N₂ and O₂ with molecular mass 28 and 32 respectively) is about 29. The molecular mass of water vapor (H₂O) is 18. When water vapor is introduced it displaces some of the air and lowers the overall molecular mass per unit volume. In fact, the difference is so great that clouds (which contain droplets of moisture as well as water vapor) readily stay in the air.

Liquid water is heavier, or more dense, than air. But liquid water isn't what makes the air humid, that's water vapor – a [gas](#) that is lighter than nitrogen and oxygen.



Jason DeRusha

Jason DeRusha filed his first report for WCCO-TV on April Fool's Day in 2003. Since then, he's earned nine Emmy Awards, his food coverage was a...

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EXPLAINING DEWPOINT AND RELATIVE HUMIDITY TO THE PUBLIC

METEOROLOGIST JEFF HABY

The public can have a tough time understanding the difference between the "meaning" of RH and dewpoint. Meteorologists have the challenge of explaining these concepts to the general public.

The public has a good grasp on how the weather makes them feel. One approach to explaining dewpoint would be to say, dewpoints above 65 F make it feel sticky and humid outside while dewpoints less than 65 F are comfortable with respect to the stickiness of the air. The higher the dewpoint is, the more moisture that is in the air. The higher the dewpoint is above 65 F, the stickier it will feel outside (feels like you have to breathe in a bunch of moisture with each breath). 75 F or above dewpoint, the air really feels sticky and humid.

RH can be more difficult to explain. The public pretty much understands that a RH of 100% means it is either foggy, very wet, or saturated outside. One misconception people have is that the RH is 100% only when it is raining. Example 1: The RH is often 100% in the early morning hours when temperature has dropped to dewpoint. Example 2: When rain first begins, it takes time for the air to saturate. RH is often much less than 100% when it is raining (it takes time and lots of evaporation to saturate air that previously has a RH of 50% for example). If the rain is not heavy enough or does not last long enough, the rain will not saturate a previously drier PBL.

RH can be explained to the public as the "closeness the air is the saturation". When the RH is less than 40%, it feels dry outside, and when the RH is greater than 80% it feels moist outside (dewpoint will determine if it is uncomfortably moist or just regularly moist). Between 40 and 80% RH is comfortable if the temperature is also comfortable.

The worst combination for human comfort is a high dewpoint (65 F or above) combined with a high RH. If the dewpoint is above 65, it will generally always feel uncomfortably humid outside. Obviously, the temperature could climb to over 100 and result in a low RH, but the quantity of moisture in the air is still high and will be noticed.

The optimum combination for human comfort is a dewpoint of about 60 F and a RH of between 50 and 70% (this would put the temperature at about 75 F). The air feels dry outside when BOTH the dewpoint is below 60 F AND the RH is less than 40%.

Now the dilemma, how does the public differentiate the "meaning" between a high dewpoint and a high RH when they both indicate the air is humid??? Dewpoint is related to the quantity of moisture in the air while relative humidity is related to how close the air is to saturation. How the public is to understand this difference in meaning can be a challenge. The challenge

can be overcome by describing how the weather feels and relate that information to the current dewpoint and relative humidity.