



Relative Humidity

indicates how moist the air is

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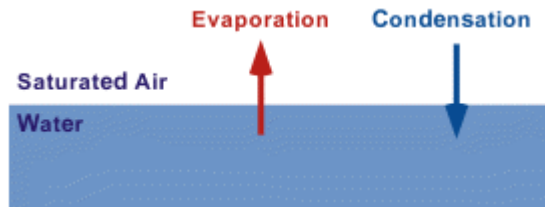
Relative humidity may be defined as the ratio of the water vapor density (mass per unit volume) to the saturation water vapor density, usually expressed in percent:

$$\text{Relative Humidity (RH)} = \frac{\text{(Actual Vapor Density)}}{\text{(Saturation Vapor Density)}} \times 100\%$$

Relative humidity is also approximately the ratio of the actual to the saturation vapor pressure.

$$\text{RH} = \frac{\text{(Actual Vapor Pressure)}}{\text{(Saturation Vapor Pressure)}} \times 100\%$$

Actual vapor pressure is a measurement of the amount of water vapor in a volume of air and increases as the amount of water vapor increases. Air that attains its saturation vapor pressure has established an equilibrium with a flat surface of water. That means, an equal number of water molecules are evaporating from the surface of the water into the air as are condensing from the air back into the water.



Saturation vapor pressure is a unique function of temperature as given in the table below. Each temperature in the table may be interpreted as a dew point temperature, because as the ground cools, dew will begin to form at the temperature corresponding to the vapor pressure in this table.

(C) Temp	(F)	Sat Vapor Prs (mb)	(C) Temp	(F)	Sat Vapor Prs (mb)
-18	00	1.5	18	65	21.0
-15	05	1.9	21	70	25.0
-12	10	2.4	24	75	29.6
-09	15	3.0	27	80	35.0
-07	20	3.7	29	85	41.0
-04	25	4.6	32	90	48.1
-01	30	5.6	35	95	56.2
02	35	6.9	38	100	65.6
04	40	8.4	41	105	76.2
07	45	10.2	43	110	87.8
10	50	12.3	46	115	101.4
13	55	14.8	49	120	116.8
16	60	17.7	52	125	134.2

Chart adapted from: [Ahrens](#)

For example, if the water vapor pressure in the air is 10.2 millibars (mb), dew will form when the ground reaches 45 degrees Fahrenheit (F). The relative humidity for air containing 10.2 mb of water vapor is simply 100% times 10.2 mb divided by the saturation vapor pressure at the actual temperature. For example, at 70 F the saturation vapor pressure is 25 mb, so the relative humidity would be

$$\mathbf{RH = 100\% \times (10.21 / 25.0) = 41\%}$$



[Terms](#) for using data resources. [CD-ROM](#) available.

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