Take the HVAC CHALLENGE™

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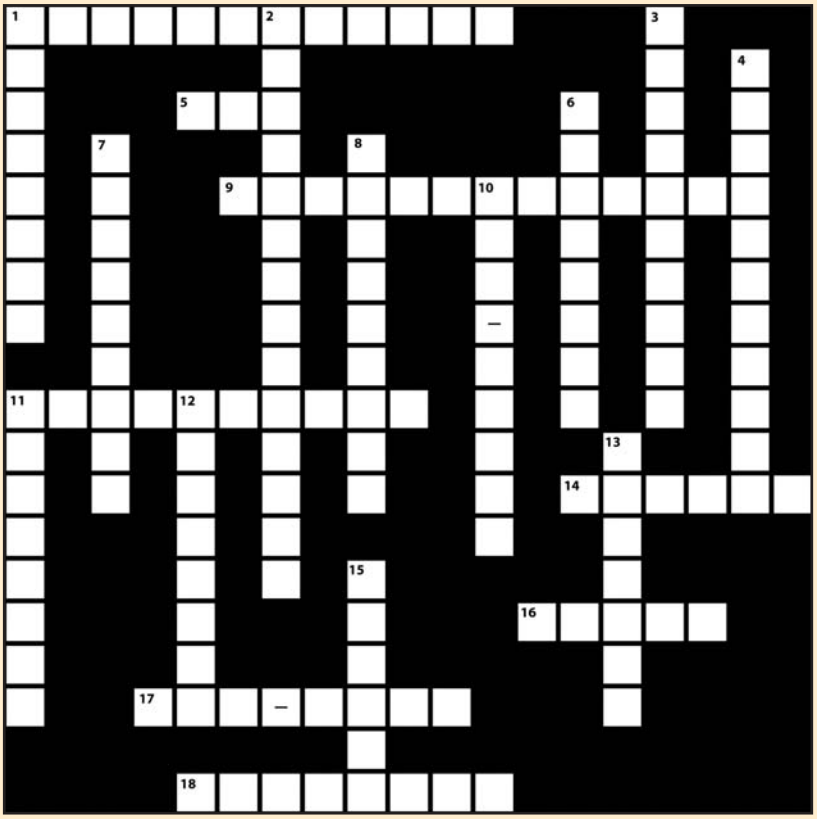
Psychrometrics



ACROSS

1. This type of air contains many gaseous components as well as water vapor and miscellaneous contaminates like smoke, pollen, and gaseous pollutants).
5. This type of air exists when all water vapor and contaminants have been removed from atmospheric air.
9. Formulas have been developed for these properties of moist air and water; however, perfect gas relations can be used instead of these formulas in most air conditioning problems.
11. This is the term used to describe when air has the maximum amount of moisture it can hold, as state of neutral equilibrium between moist air and the condensed water phase.
14. The "_____ of saturation" is the ratio of the air humidity ratio to the humidity ratio of saturated moist air at the same temperature and pressure.
16. This type of air is a binary mixture of dry air and water vapor.
17. The equilibrium temperature reached with a psychrometer's "wet-bulb" is placed in an airstream and water evaporates from a wick to the point where simultaneous heat and mass transfer from the bulb is reach.
18. This ratio is defined as the ratio of the mass of water vapor to the mass of dry air contained in the sample of air.

DOWN

1. This humidity ratio is the ratio of the mass of water vapor to the total volume of the air sample.
2. This deals with the thermodynamic properties of moist air and uses these properties to analyze conditions and processes involving moist air.
3. Along with temperature, this pressure of atmospheric air varies considerably with altitude as well as with local geographic and weather conditions.
4. This device consists of two thermometers where one thermometer's bulb is covered by a wick that has been thoroughly wetted with water.
6. The term gain due to addition of energy alone that does not include the energy contributions due to addition of water or water vapor.
7. A common mixing process of two airstreams in which the state point of the resulting mixture lies on a straight line connecting the state points of the two streams being mixed and divides the line into two segments in the same ratio as the mass of dry air in the two airstreams when plotted on a psychrometric chart.
8. This term is used to describe such moist air properties as the diffusion coefficient, viscosity, thermal conductivity, and the thermal diffusion factor.
10. This is the temperature of moist air saturated at the same pressure with the same humidity ratio as the given sample of moist air.
11. This humidity ratio is the ratio of the mass of water vapor to the total mass of the moist air sample.
12. This humidity ratio is the ratio of the mole fraction of water vapor in a given moist air sample to the mole fraction in an air sample saturated at the same temperature and pressure.
13. This is the ratio of the total mass to the total volume of moist air.
15. This state and the vapor state may coexist in equilibrium between the triple-point and critical point temperatures of water.

To brush up on the facts behind this month's clues, refer to Chapter 3 ("Heat Transfer") in the 2001 *ASHRAE Handbook — Fundamentals*.

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Solution to October's HVAC Challenge™