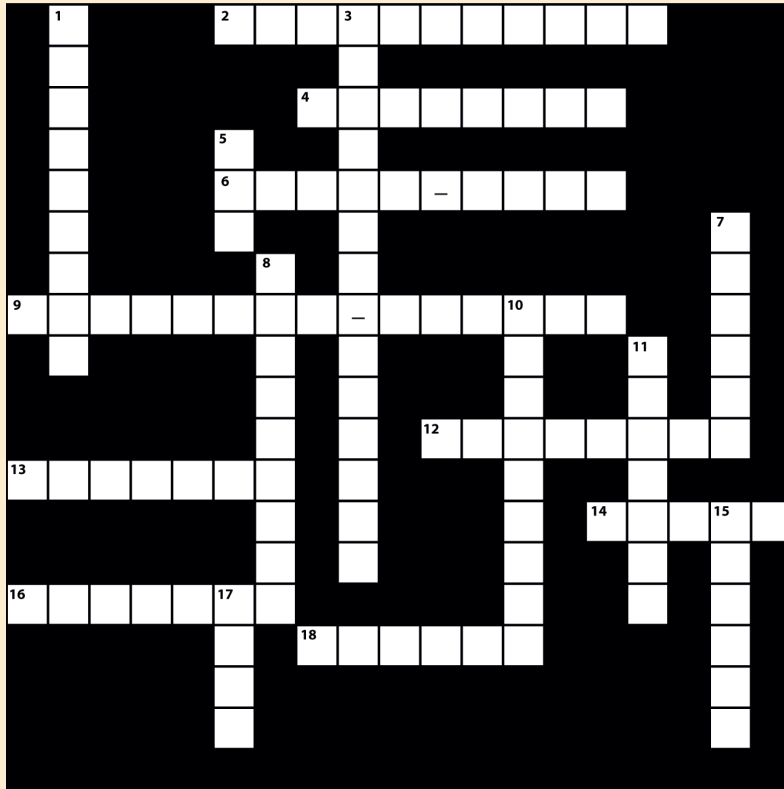


Take the HVAC CHALLENGE™

BY STEVEN G. LIESCHEIDT, P.E., CSI-CCS, CCPR

► Fans



ACROSS

- This data, as tabulated in the usual fan tables, is based on arbitrary increments of flow and pressure.
- The operating speeds at which resonances tend to cause objectionable vibrations.
- This type of fan has impellers that produce pressure principally by the change in air velocity as it passes through the impeller blades, with no pressure being produced by centrifugal force.
- A fan type that is also referred to as backward-inclined.
- All fans produce this by altering the airflow's velocity vector.
- This type of centrifugal fan is the highest efficiency of all centrifugal fans designs.
- This is a function of the fan design, volume airflow rate, total pressure, and efficiency, and is reported by fan manufacturers as sound power levels in eight octave bands.
- This type of specialized type fan design has a performance similar to a backward-curved fan, except that the capacity and pressure are lower and the efficiency is

lower than the backward-curved fan, and the performance may have a dip to the left of the peak pressure.

- This type of fan has higher pressure characteristics than airfoil, backward-curved, and backward-inclined fans, and their curves may have a break to the left of the peak pressure and should not be operated in this area of the curve.

DOWN

- This type of fan is somewhat more efficient and capable of developing more useful static pressure than a propeller fan and has a hub that is usually less than half the fan tip diameter.
- This type of centrifugal type fan has a flatter pressure curve than airfoil, backward-curved, and backward-inclined type centrifugal fans.
- To control air the characteristic curve of either this or the system must change.
- This organization publishes Standard 51 "Laboratory Methods of Testing Fans for Aerodynamic Performance Ratings."
- This is historically a low-efficiency type

fan, with limited to low-pressure applications and a primary energy transfer by velocity pressure.

- This type of axial type fan has good blade design that gives medium- to high-pressure capacity at good efficiency, and the blades may have fixed, adjustable, or controllable pitch.
- At this point in testing of a fan, the duct is completely blocked off.
- These calculated effect factors are only an approximation, and fans supplied by different manufacturers do not necessarily react to this in the same way.
- This association publishes Standard 210 "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating."

To brush up on the facts behind this month's clues, refer to Chapter 18 ("Fans") in the **2004 ASHRAE Handbook - Systems and Equipment**.

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Now, check out the answers for this month's "HVAC Challenge" on page 69 or check out answers from past puzzles on www.esmagazine.com.

Solution to February's HVAC Challenge™

