Take the HVAC CHALLENGE™

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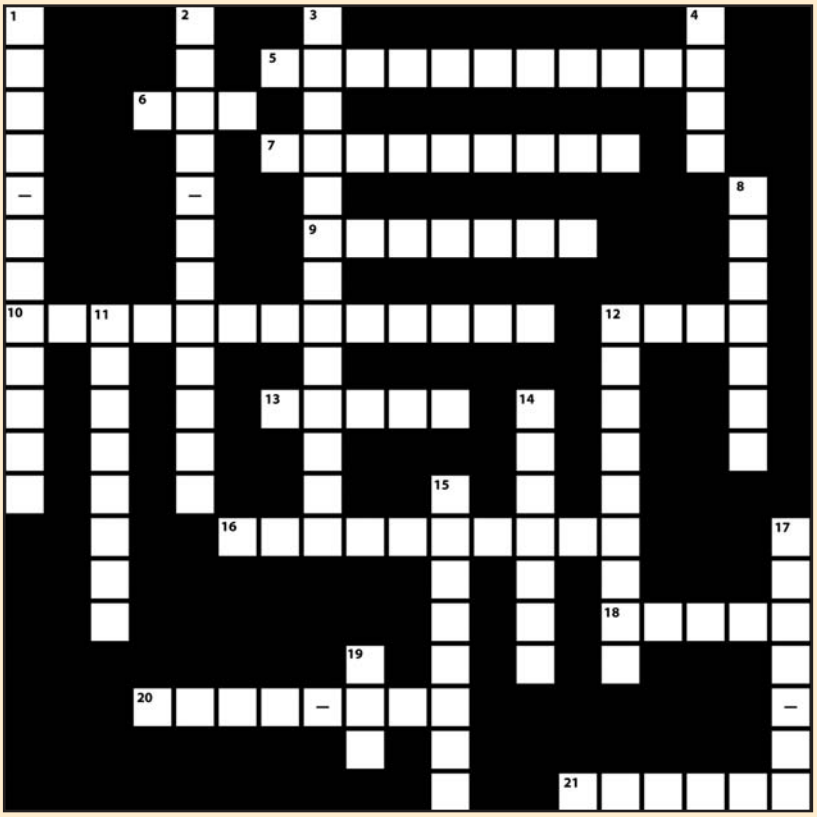
Unit Ventilators, Unit Heaters, and Makeup Air Units



ACROSS

5. A heating unit ventilator can provide this type of cooling by bringing in outdoor air whenever the room temperature is above the room setpoint.
6. This type of heating medium is frequently preferred in small unit heater installations where the number of units does not justify the expense and space requirements of a new boiler system or where individual metering of the fuel supply is required.
7. This directs a portion of the unit ventilator air into a delivery duct along the sill of the window to help prevent downdrafts in classrooms with large window areas in cold climates.
9. This type of unit heater is used for applications in which a more attractive appearance is desired.
10. In this type of makeup air heater, ventilation air to the heater must be ducted directly from outdoors to limit the concentration of combustion products in the conditioned space below 25 ppm for CO, 3 ppm for NO_2, and 5,000 ppm for CO_2.
12. This type of unit heater is used where the air handler is remote from the heater and sometimes provide an economical means of adding heating to an existing cooling or ventilating systems with ductwork.
13. This type of heating medium in unit heaters is relatively inexpensive but requires a boiler and piping system.
16. This type of heating unit is an assembly whose principal functions are to heat, ventilate, and cool a space by introducing outdoor air in quantities up to 100% of it's rated capacity.
18. Unit ventilators are available for mounting in this location or ceiling mounting or recessed applications.
20. Unit heaters are customarily rated at this air delivery point.
21. These types of units are designed to condition ventilation air introduced into a space or to replace air exhausted from a building.

DOWN

1. This type of unit heater is one in which the fan blows air through the heating element in the unit.
2. This type of unit heater is one in which the fan draws air through the heating element in the unit.
3. This is obtained by installing the return air intake along the windowsill to help prevent downdrafts in classrooms with large window areas in cold climates.
4. This organization publishes Standard Z28.3b Nonrecirculating direct gas-fired industrial air heaters.
8. This is accomplished with finned radiators of moderate capacity installed along the wall under window areas to help prevent downdrafts in classrooms with large window areas in cold climates.
11. For a steam or hot water unit heater, these can provide either on/off operation of the unit fan or continuous fan operation with modulation of heat output.
12. This can be a problem in classrooms with large window areas in cold climates.
14. If these are needed in unit heaters then centrifugal fan units or cabinet type units should be used instead of propeller type unit heaters which are design to operate with heater friction loss only.
15. This heating medium is used in unit heaters when this type of low-cost power is available for isolated locations, intermittent use, supplementary heating, or temporary service.
17. This stage of control generates full heat with the outdoor damper closed so that the room air is rapidly recirculated and heated until the room temperature approaches the desired level.
19. This component in a unit heater can be a propeller or centrifugal type.

To brush up on the facts behind this month's clues, refer to Chapter 31 ("Unit Ventilators, Unit Heaters and Makeup Air Units") in the *2004 ASHRAE Handbook —HVAC Systems and Equipment*.

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