



## Forced Air vs. Hydronic Heat

by Henry Spies

**Q.** *What are the advantages of hot water heating systems vs. warm air systems?*

**A.** Books have been written on this subject. In brief, both systems are capable of producing identical comfort levels if properly designed. In general, a pumped hot water system will cost more to install than a warm air system, although the use of plastic piping has decreased the difference. Furnaces and boilers are available in similar efficiencies, so operating costs are about the same for either system.

Where summer cooling is required, forced air systems make more sense. There is no reasonable way to use a hydronic system for cooling. You can install individual air handling units, which blow air over chilled water in the system. However, this can be expensive and noisy, and essentially converts the water system to an air system. If a separate duct system is required for cooling, the total cost of the separate heating and cooling systems far exceeds the cost of a combined air system.

The separate system installation does have some advantages, however. The heat can be supplied along outside walls under windows, which is the best placement for a heat source. And the cooled air can be supplied from registers in the center of the ceiling or high on the inside sidewalls, which is the best place to introduce cooled air. The duct system should have supply registers and return grilles that can be sealed during the heating season to prevent condensation in the ductwork when the system is not in use.

Air movement and dust control are other factors you should consider. There is less air movement with a hydronic system, since all movement is by convection rather than by a blower. This can be an advantage or a disadvantage. Many people prefer some air movement (which may account for the popularity of paddle fans), while others, particularly elderly clients, consider air movement to be a "draft." If an air system is properly designed, however — with the size and placement of supply registers carefully chosen — air movement should not be noticeable. Heat pump systems are another matter, though. They move about twice as much air, and at a lower temperature, than furnace-supplied systems. Since this air might be uncomfortable, heat pumps are not recommended for use in housing for the elderly.

Dust control can be a problem with either system. Dirt streaking of walls above hydronic baseboards is as common as from warm air supply registers. Much work has been done in the hydronics industry to minimize streaking, but it still occurs with some designs. An air system can be equipped with filters that clean the air and reduce dust. The ordinary glass fiber furnace filter removes only about 5% of the dust from the air passing through it. High-efficiency mechanical filters, using a pleated paper filter element, remove about 95% of the dust in the air stream. Electronic filters remove about 99%, including smoke particles. Activated charcoal filters can be added to remove odors and organic chemicals.

### Venting a Shed Dormer

**Q.** *We build a lot of shed dormers that start at the ridge and have a roof pitch of about 3:12. I have never installed a ridge vent because I am concerned that snow will build up and leak through the vent on the dormer side. Now the code inspector insists the roofs must be vented. How should we do this?*

**A.** A ridge vent should work at a pitch of 3/12, but manufacturers warn against using one at any slope less than that. The vent should have a snow baffle to keep snow from blowing up the dormer roof and into the vent, and the snow baffle must have weep holes so that melting snow can drain from it. When the wind is blowing from the other (nondormered) side of the roof, air will be blowing out the lee side vent, keeping it clear of snow.

When the slope is less than 3/12, recent research indicates that no venting should be used (though convincing the code official of this may not be so easy). Research by William Rose at the University of Illinois Small Homes Council-Building Research Council indicates that if a vapor retarder is installed in the ceiling and the rafter space is sealed tightly and stuffed with insulation, ventilation is not required. The rafter spaces should be essentially airtight, and have absolutely no penetrations of the ceiling from inside the house. ■

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