



Sizing a Steam Boiler

by Henry Spies

Q. I am remodeling a large, older home that is heated by a low-pressure steam system. Because of the size of the house, steam seems to be a good system to use, but the boiler is obsolete. We are adding insulation and sealed double glazing. How can I calculate the required size of the new boiler? Or can the system be converted to hot water?

A. In a steam system, the boiler is not sized according to the calculated heat loss of the building. Instead, it must be sized according to the number of square feet of installed radiation. Tables that give the equivalent square feet of radiation are available for most old radiators from the Hydronics Institute (P.O. Box 219, Berkeley Heights, NJ 07922; 908/464-8200). A new radiator should include that size in the specs. Steam boilers normally carry a specification plate that gives the number of square feet of radiation the boiler can supply.

If the boiler is sized according to the calculated heat load, it will not supply enough steam to reach the far end of the system without condensing first, and the system will never work properly. This is a common problem when conversion burners (gas or oil) are installed in old coal-fired boilers. The burner must be large enough to generate the same amount of steam as the coal-fired unit, and that is often two or three times as large as the burner size derived from the calculated heat loss. A steam system which is underfired can have an efficiency approaching zero, regardless of the reported efficiency of the boiler.

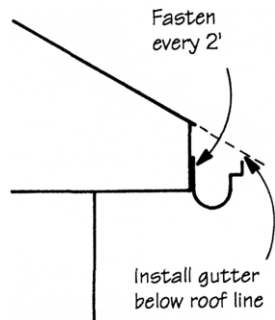
If the house has a two-pipe steam system, as opposed to a one-pipe system, it can be converted to a pumped hot water (hydronic) system with minor changes in the piping (removing the steam traps and the Hartford loop). You can then use the same radiators. The hydronic systems will produce a more even heat, especially if the system temperature is controlled to match outdoor temperatures. By contrast, a steam radiator is either on or off. For more information on converting steam systems to hydronic, contact the Hydronics Institute.

Durable Gutters

Q. How should gutters be attached to prevent them from getting ripped off the fascia when ice accumulates during winter?

A. Install gutter hangers at least 24

Gutter Placement



To prevent snow slides from tearing the gutter off, install gutters below the roof line, as shown.

inches on-center. Make sure the spikes fasten through the fascia to a 2x sub-fascia or to rafter or truss tails. Also, mount the gutters so that a straight-edge laid on the roof extends above the outer edge of the gutter (see illustration). This will help prevent snow slides from taking the gutter off.

Rx for Bleeding Knots

Q. What do you recommend for covering knots on exterior wood siding to prevent bleed-through?

A. Two coats of primer and two coats of finish paint should do the job. The sealers used for interior surfaces, such as pigmented shellac, will cause premature paint failure on the exterior.

Footing Foundation

Q. I have been told that crushed stone should be placed beneath foundation footings as a capillary break to prevent moisture from migrating up the foundation wall into the basement or crawlspace. Won't this make the footing settle?

A. A concrete footing should rest on undisturbed inorganic soil. The crushed stone could cause settling of the footing. Moisture rising through the footing shouldn't be a great problem if you have adequate perimeter drainage. As a failsafe, you might install a waterproofing membrane between the footing and the foundation. W.R. Meadows (800/342-5976) sells a line of asphaltic membranes for this purpose. ■

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