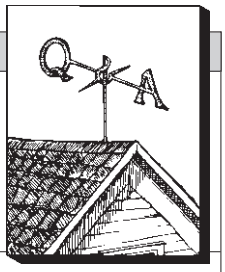

Makeup Air

by Hank Spies

Q. *Do wood stoves and fireplaces need special provisions for makeup air in tightly built houses? If so, how do you calculate the volume of air needed to feed fires and how do you deliver it where needed?*

A. Tight construction does indeed restrict the air available for combustion. Fuel-burning appliances take 50 cubic feet of air for each 1,000 Btus. If a 1,500-square-foot house has an infiltration rate of 1/2 air change per hour, it would provide 6,000 cubic feet per hour, or 100 cfm. This is enough to support a 120,000, Btu per hour furnace or wood burner, assuming no other vents or exhaust fans are exhausting air. According to data from the Wood Burner's Encyclopedia, a fireplace without closed doors needs 90 to 350 cfm and an open stove 50 to 125 ctm of makeup air. Yet, a bathroom vent will exhaust 60 cfm, a standard range hood 150 cfm, and a downdraft cooktop 500 cfm. If any of these appliances are running at the same time as a furnace, stove, or fireplace, some makeup air is needed to gain full efficiency of the heating system. If the house is so airtight that the infiltration rate is only 1/4 air change per hour (it can be as low as 1/10), the need for makeup air is especially important. Any standard fuel-burning appliance with an atmospheric vent will probably cause spillage of combustion gases into the house.

One way to avoid these problems is to use an "airtight" wood stove, which needs less than 25 cfm for combustion when the doors are closed. This is so lwo that depressurization will not occur in even the tightest of houses. A retrofit outside air supply can also be provided for conventional woodstoves and fireplaces, though these may not always work because wind blowing across a vent can cause it to backdraft. Standards do not exist for makeup air for wood-burning appliances. However, researchers suggest that a 4-inch vent is adequate to supply most large stoves and fireplaces. For wood stoves, the air supply can discharge beneath or behind the stove. Fireplaces should always have the outside air intake coming directly into the firebox.

Any tight house should also be equipped with an auxiliary ventilation systems to prevent depressurization by exhaust fans. An air-to-air heat exchanger will serve as an air source in many cases, since the delivery rate of the intake fan is increased by a negative pressure in the house. Some builders install a "barometric" damper on an intake from the outside into the return air duct. This damper should be balanced so that it will open to admit outside air when the house is depressurized by exhaust fans or heating equipment. In England, "trickle vents" are installed in the window assemblies to provide air intakes.

Slab on Slab Details

Q. *I'm working on an enclosed porch with a slab that is 6 inches below the inside floor height. Can new concrete be poured over the old slab to bring the floors to the same height? What must be done to ensure proper bonding between the two surfaces? How can I ensure an adequate vapor barrier below the pad?*

A. It certainly is possible to pour a new slab of that thickness over the existing slab. I would not want the new slab to bond to the old, although you might consider doweling the new slab to the framing or slab of the house floor to prevent differential settlement. A sheet of polyethylene over the old slab will provide both a vapor retarder and a bond breaker.

Miter Mystery

Q. *How does one miter inside and outside corners on a curved tin cornice molding?*

A. Probably the simplest way is to make up a wood miter box with an insert to support the curved section. Then spread wood strips to fill most of the section. The make the insert, start with plastic wood over the wood strips and press the molding, protected by a sheet of plastic food wrap, into place to form an exact backup for the section. With this, you can cut the molding without distorting it. If it is too large to use a standard hacksaw, a fine-tooth blade (24 to 32) from a power hacksaw should be long enough. If the molding and miter box are not too large, it may fit in a power miter box quipped with an abrasive or metal-cutting blade.

Beefed Up Beam

Q. *I would like to build a kneewall addition on the top story of a log house. Will an oversized ridge beam supported at the gable ends of the building support enough of the roof's weight to keep the kneewalls from buckling out?*

A. I am not sure what you mean by a 'kneewall addition," but if it is either a shed dormer on one side of the roof or a second story with half-height exterior walls, the answer is essentially the same—a full structural ridge beam will eliminate any thrust on the kneewall. The beam will have to be strong enough to support the full load of half the roof at the ridge, just as in a post-and-beam house. Less than full support may cause buckling of the kneewall. ■

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