Even Envelope Insulation

Q: Buildings have always had more insulation in the attic than in the walls or below ground level. This I believe is due to warm air rising. With the advent of airtight construction and mechanical ventilation with heat recovery, is it still necessary to insulate the attic more than the walls? I believe pre-fab homes imported from Sweden have equal R-value insulation around the entire shell. This sounds like the logical way to go.—*Philip Cyr, Sunrise Technologies, Caribou, Maine*

A: The reason for putting more insulation in the attic is twofold. First, in older uninsulated homes, air near the ceilings may be as much as 10°F hotter than air at the floor. So the rate of heat loss was significantly greater at the ceiling. The second reason is that after the first 4 to 6 inches of insulation (in 2x4 or 2x6 construction), it is a lot cheaper to add insulation to the ceiling than to the walls. So up to a point, extra insulation is most cost-effective in the ceiling. In a well-insulated home, the first reason is no longer valid since there is very little temperature difference from floor to ceiling. The second reason, though, still holds as long as you can cheaply stuff insulation in your attic. Cathedral ceilings are an exception to this. Once the rafters are filled with fiberglass, the incremental cost of adding more insulation is comparable to that of increasing wall insulation levels.

Venting Cathedral Ceilings

Q: Cathedral ceilings are vented at the ridge and eaves to allow airflow through the ceiling. Doesn't this airflow remove heat from the fiberglass insulation in the winter? Is it better practice to separate the insulation from the air flow with a permeable, fireproof material such as drywall, leaving approximately ½ inch between the drywall and bottom of the roof?—*Larry Gunther, Neola, Utah*

A: Anything that induces airflow through a fiberglass batt will reduce its effectiveness, since fiberglass works by reducing air movement. Air flowing *across* a batt, however, should not seriously reduce the R-value except with very thin batts and fast air movement.

In laboratory experiments, a 3-inch batt on an attic floor had a 29-percent reduction in R-value caused by air flowing across it at 2 mph. In another experiment, 6 inches of loose-fill fiberglass had a 14-percent reduction at similar airspeeds. With the thicker batts used commonly today, the reductions will be less. Also, it is unlikely that airflows across the insulation reach even this speed except under extreme conditions.

To be safe, you could build a baffle such as you suggest or use manufactured baffles, such as ProperVent (ProperVent Inc., 750 Boone Ave. N., Minneapolis, Minn. 55427 (612) 544-9776). If you're going to the trouble of making your own baffle, use something like perforated foilboard (Dennyboard or Thermoply). You will have an effective summertime radiant barrier as well. Drywall is probably not an ideal product for a baffle since it can get soggy if there is excess condensation or a roof leak. Also, unless it is perforated it may trap moisture.

Another possibility would be to perforate the kraft paper on the batts and face the paper up. Of course, you'll have a continuous poly barrier below.

Thermal Scanners

Q: I would like some information on the AGA 782 thermal scanner shown on the opening page of "House Doctors with Better Medicine" (9/84, p. 27). Are there many other companies that sell thermal scanners?—*Leon Grant, Dover, N.J.*

A: Swedish-based AGA Infrared Systems AB is the world's oldest and largest manufacturer of infrared scanning equipment. Their U.S. office, AGA America, is located at 550 County Ave., Secaucus, N.J. 07094. The top-of-the-line Model 782 costs about $32,000 and has a great many features. A hand-held version used by Princeton Energy Partners in most of its work, the AGA 110, costs about $12,500. Other hand-held thermal scanners are available from Inframetrics Inc., 25 Wiggins Ave., Bedford, Mass. 01730, and Hughes Aircraft, El Segundo, Calif.

Less expensive infrared thermometers that measure the temperature of a small section of the wall at a time are available from several companies, including Optical Coating Laboratory, 2789 Northpoint Parkway, Santa Rosa, Calif. 95401, and Environment One, 2773 Balltown Rd., Schenectady, N.Y. 12309. When buying this type of equipment, discuss the applications with the manufacturer. In general, building applications require high-sensitivity monitors.

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