Do-It-Yourself Windows

Q: I have heard of various ways to construct site-built, double-pane windows. One way is to seal the inner pane airtight, then to fit the outer pane somewhat loose. Other ways are similar, involving small holes to let the inner air space "breathe." What do you recommend? Also, what maximum spacing do you recommend?—*David Lile, Santa Cruz, Calif.*

A: Since it is virtually impossible to achieve a hermetic seal in site-built windows (except with exotic hot-melt systems used sometimes in commercial retrofits), we agree with your suggestions. Keep the inside pane as airtight as possible to keep moist household air out of the unit, and provide the moisture an escape route to the outdoors once it gets in. A few ⅜-inch weep holes, drilled through the sill and stuffed with fiberglass or screening (to keep bugs out) is one detail we've seen. This seems preferable to a "loose" outer pane.

As for the spacing, beyond ¾-inch, there is no gain in thermal performance. A one-inch double-glass unit is rated at about R-2 versus about R-1.8 for a ⅝-inch unit. Incidentally, in standard sizes, factory-sealed double units cost about the same as two individual lites of glass. So unless you are retrofitting or require extra-thick windows, factory-sealed units may be your best bet.

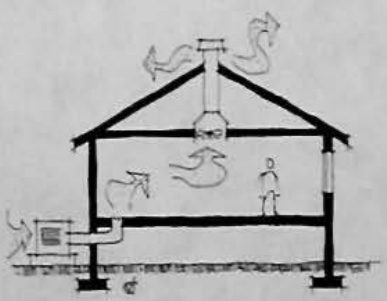
Wall-Cavity Concrete

Q: What do you think of using lightweight concrete insulation such as Thermal Krete™ as a filler for double 2x4 walls? Would this eliminate the need for a moisture and/or air barrier?—*Lane Felker, Jefferson, Md.*

A: Thermal Krete ("Product Update," 11/83) is a special magnesite concrete that is pumped into wall cavities in a way that traps air bubbles. It insulates to about R-4 per inch. According to company president Fred Moer, the thickest cavity in which Thermal Krete has been installed is a 2x8 cathedral ceiling. The company should be consulted regarding applications beyond 8 inches thick. The weight of the material (4-5 pounds per cubic foot) could bow out the drywall, or the water from the drying concrete could damage materials. Thermal Krete is fairly permeable to water vapor, so a vapor retarder is recommended. As for air leakage, you should be primarily concerned about places where the concrete does not penetrate; e.g., under soleplates, through ceiling penetrations, and out through interior partitions. Thermal Krete's manufacturer, Omni Tech Energy Products, welcomes inquiries at (616) 458-5894.

Swamp Cooler Scheme

Q: We plan to build a pilot energy-efficient home in our city. We have a long and somewhat severe cooling period with a humidity level that is relatively low (10-15%). An evaporative cooling system should suffice, but there are some drawbacks: dust, open windows, safety, noise, and the like. I would like to duct the system under a wood-framed floor, supplying cooled air through floor registers, and exhausting it out through a roof cupola. I am



sure an attic fan will be necessary. Do you see any obvious problems with the scheme I have described?—*Jimmy Moore, Odessa, Texas*

A: Single-stage, direct evaporative coolers, also called "swamp coolers," *do* provide a cost-effective means of cooling houses during hot dry periods. Their main drawback is moister inside air—the cost for a lower dry-bulb temperature. Due to low energy use (for a small fan and water pump), they are popular in parts of the West and Southwest. (See "Notebook," 2/84, for the conditions where evaporative cooling is effective.)

Delivering cooled air through the floor and exhausting it through the roof runs counter to the tendency of warm air to rise, cool air to drop. But an exhaust fan in the roof should pull air through the whole house. Two cautions: 1) Make sure the exhaust fan is matched to the volume of air supplied through the floor, and 2) provide a duct between the ceiling grille and roof exhaust. This will keep moist air out of the attic, where it might condense at night and cause dampness problems in the structure and insulation. Also, provide a means of closing off the exhaust during the heating season.

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