Hazardous Insulation?

Q. Are there any health hazards associated with applying rigid foil-faced polyisocyanurate insulation on the inside of the existing walls of a living space?

I am aware that these insulations give off toxic gases as they burn. The question in my mind is whether they are safe on a day-to-day basis within the building envelope with an air change rate of, say, .75 per hour? - Rob Harlan, Mendocino, Calif.

A. Rigid polyisocyanurate insulation is foamed with Freon gas, a fluorinated hydrocarbon often used as a refrigerant and, until recently, as a propellent in aerosols. The gas is inert and considered non-toxic, except in very high concentrations of over 1000 ppm. The small quantities that will be released from the foam by diffusion or rupture are not considered a health hazard by the several health authorities we contacted. The upper-limit service temperature for this type of foam is 250°F.

In uncontrolled combustion, all flammable building materials release high levels of toxic fumes. The National Fire Protection Association recommends that all insulation products be contained behind drywall or a suitable fire retarder. Local building codes should be consulted regarding specific applications.

Films for Collectors

Q. I have heard a lot lately about light-transmitting, heat-reflecting window films, such as Heat Mirror™ and 3-M's Scotchtint™. These would seem to be ideal materials for use in solar collector glazings to reduce heat loss. Could these be used in addition to black chrome to improve collector efficiency? Are there any collector manufacturers using such films in their collectors? - Harold Murray, Bowie, Md.

A. Low-transmission films such as Scotchtint were developed to block solar transmission and would not help collector efficiency. The high-transmission, low-emissivity films such as Heat Mirror or 3M's Sungain™ might boost collector efficiencies in some applications, particularly high-temperature collectors in cold climates. In this case, the added insulation value might offset the transmission losses. They may still not justify the added expense.

As these products were developed for building glazings, their durability in collector applications is in question. The effects of high temperatures, thermal cycling, and high UV exposure have only been looked at in a preliminary way. 3M tells us that its Sungain film will become brittle at temperatures above 250°F, prohibiting its use in some collector applications.

While we know of no manufacturer using such films in their collectors, we have heard of some experimentation in this direction.

Passive Design Method

Q. I have two questions concerning the *Passive Solar Design Handbook*, Volume II and III. For a house with a combination solar system (i.e., a water wall, direct gain, and Trombe wall in one building), how does one go about finding the solar savings fraction? Do the calculations take into account internal gains?—Richard Glaser, Glenwood Springs, Colo.

A. If the building has more than one type of system, divide the building load coefficient by the *combined* areas of all the passive system types to get a single Load Collector Ratio. (LCR). Using that LCR, determine the solar savings fraction for *each* system type. This amounts to assuming that the entire solar wall is first one type, then the next, and so forth. The final solar savings fraction is the average of each fraction weighted according to the percentage each system represents in the combined solar collector area. The procedure is explained well enough in Volume III. The LCR method does not take into account heat gains from people, lights, or appliances. For a closer look at the passive design method and for the answers to many other questions you may have about it, be sure to read the two-part article explaining the use of the *Passive Solar Design Handbook* beginning in this issue on page 48.

Acoustical Sealants

Q. The use of acoustical sealant for sealing lap joints between sheets of polyethylene vapor barriers is mentioned in *Solar Age*, November 1982, p. 21, and in *Solar Age*, December 1982, p. 17. Do you have any information as to brand names and suppliers of acoustical sealants or other products suitable for this application?—John Tweet, Tolland, Conn.

A. The acoustical sealant mentioned in these articles is a non-skinning, non-curing sealant developed for sound control in drywall construction and in wall perforations (e.g., around electrical boxes). One such acoustical sealant is available in one-quart cartridges from Tremco, 10701 Shaker Blvd., Cleveland, Ohio 44104.

A variety of tapes useful in these applications are available from Ideal Tape, Inc., 1400 Middlesex St., Lowell, Mass. 01853. Their products include a clear polyethylene tape (#415) suitable for all-weather use, and a 2-mil aluminum tape (#488,487) for use with foil surfaces.

Address questions about articles in Solar Age *to: Q&A,* Solar Age, *Church Hill, Harrisville, N.H. 03450. If you want a reply, enclose a self-addressed stamped envelope, and a member of our staff will respond. Questions of general interest will be printed in the magazine.*