

Breathing Free, Part I

How to do battle with formaldehyde and radon in houses

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Indoor air quality is an issue of staggering complexity—where building details are evaluated in terms of deaths per 100,000 and laboratory rats are the final arbiters of prickly debates. What is the conscientious contractor to do short of study epidemiology and biochemistry before he builds his next house? Fortunately, simple precautions and common sense can go a long way toward keeping the indoor environment wholesome in the tightest of homes. In this and next month's columns, we'll take a look at the major indoor pollutants and how best to deal with them.

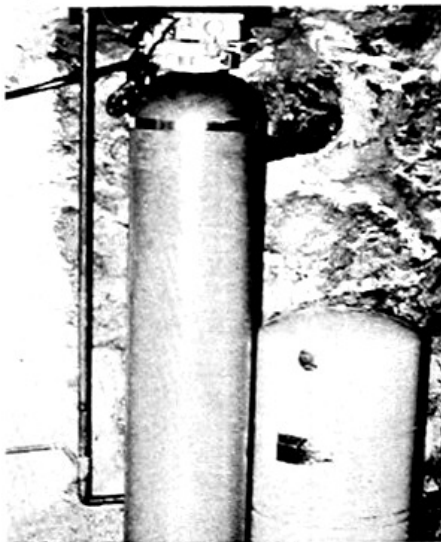
Formaldehyde

Formaldehyde is used in many building products, finishes, and furnishings because it has desirable chemical properties and is inexpensive. Nearly all products made with formaldehyde outgas to some extent, but few contribute significantly to indoor air problems. Of chief concern are wood products made with *urea* formaldehyde (UF) glues. UF products include most hardwood plywoods and decorative paneling and nearly all particleboards. On the other hand, nearly all softwood plywoods (interior and exterior) and all exterior sheathings and composition boards use *phenol* formaldehyde adhesives. The phenolic adhesives are more stable chemically and have negligible emissions.

The emission levels of many UF products have been reduced over the last few years in response to consumer pressures and in anticipation of a new HUD standard due to take effect in early 1985 that will regulate the formaldehyde emissions in mobile homes. The HUD standard will limit particleboard emissions in mobile homes to 0.3 ppm (parts per million) and plywood paneling emissions to 0.2 ppm based on a standard "large-scale test chamber." The "low-emission" products still have over three times the emissions of phenolic-based products, which are typically below 0.1 ppm.

Other sources of airborne formaldehyde are carpets (in the backing glue), perma-

nent-press fabrics, gas combustion, tobacco smoke and UF-foam insulation. Heat and humidity will increase the level of emission from materials and, in general, the rate will diminish as materials age. Mobile homes often have high rates due to the large use of wood paneling and particleboard decking in a small area.



Researchers at the University of Maine developed this activated carbon filter for purifying radon-rich water. The filter—the tall cylinder on left—costs about \$500 installed. For information, write Land and Water Resource Center, 11 Coburn Hall, U. of Maine, Orono, Maine 04469.

Excessive levels of formaldehyde can irritate the eyes, nose, and throat, and cause headaches and dizziness. Long-term exposure may harm the respiratory tract. Tests have demonstrated a risk of cancer to rats in high doses, but there is little agreement on how this relates to humans.

The obvious first line of attack is to avoid materials high in formaldehyde when feasible. High on this list are decorative paneling and unfinished particleboard, medium-density fiberboard, and hardwood plywoods (such as luan). Products with an impermeable facing (vinyl or plastic laminate) laminated on all sides are probably fine. Products with some exposed faces are less OK.

According to researchers at Oak Ridge National Labs who have studied formaldehyde emissions, it's almost impossible for a

Steve Bliss is an associate editor at Solar Age.