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Urea Formaldehyde Foam as Home Insulation

By: Henry Hirschland
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Summary

Urea formaldehyde foam is no longer used to insulate homes because in some cases, though not always, it releases formaldehyde gas into the rooms of the house. Formaldehyde in high enough concentrations is an eye irritant, gives some people flu-like symptoms and causes some people to develop rashes. Studies have been done to find out if it is a carcinogen without any conclusive results.

Owners of older houses who wish to check for the presence of the foam, find out if it is releasing gas, and have it removed if needed, can:

1. Hire professionals to check for the presence of the material in their walls, or
   drill holes and check for themselves;
2. Ask the Monroe County Health Department to monitor for the presence of formaldehyde gas in their rooms, or
   buy a kit and take the readings themselves;
3. And, if the reading is high, have the material removed (which costs up to $20,000), or
   seal all the routes of escape. (sealing all routes of escape makes a house air-tight, and some circulation of outside air is recommended by the Health Department.)
4. Finally, purchasers of older homes who want the houses inspected for urea formaldehyde foam can include a rider so stating in their purchase offer.

This Bulletin describes the problem and what can be done about it, and gives a sample rider that was added to a purchase offer by the author.

Background

In the United States approximately 500,000 homes (5) have been insulated with Urea Formaldehyde (U-F) foam insulation. This insulation was installed primarily in older homes where outside walls were not originally insulated. Urea formaldehyde foam is applied by mixing a resin and a catalyst just before use, adding a gas foaming agent (usually air) and blowing the foam into the cavity to be insulated. Perfect installation requires careful

timing and following directions precisely. Improperly installed U-F foam may leak formaldehyde gas which is a health problem to some. Properly installed foam may also give off the gas but it is much less likely to do so. The amount of formaldehyde gas released will decrease with time but it may take several years to reach insignificant levels (3).

Mobile homes that are built with particle board can have formaldehyde concentrations even higher than houses and therefore present an even more serious threat to health.

The possibility that U-F insulation might release formaldehyde gas in concentrations high enough to produce adverse health effects was, of course not originally realized. Reports of family illness and strange odors brought public health investigators out to examine the premises. They documented formaldehyde gas in the air which led to the discovery that the foam could leak. It is the formaldehyde which is the health hazard, not the foam.

Once the health problems were documented and their cause identified the Consumer Product Safety Commission (CPSC) had the foam banned in residences and schools. The ban should go into effect in August 1982. Not everybody is sensitive tc relatively low concentrations of formaldehyde gas fumes, but the possibility of living in a house that leaks formaldehyde or of selling a house to someone who is sensitive worries many people.

Three problems associated with U-F foam insulation are discussed in this report: 1. identifying U-F foam insulation and determing whether or not a potential health hazard exists; 2. corrective action to eliminate or minimize the potential health hazard associated with U-F foam insulation; and 3. adding a clause to a purchase offer that will protect the buyer of a home in case of trouble.

How People React to Formaldehyde

Some people are much more sensitive to formaldehyde than others. Overexposure to the gas produces flu-like illnesses, particularly upper respiratory tract problems, headaches, dizziness, nausea, vomiting, skin rashes and a burning sensation in the eyes (1).

There is also a question of whether formaldehyde is a carcinogen. E. I. du Pont de Nemours & Co. has conducted an epidemiological study (6) of workers exposed to formaldehyde gas from 1957 to 1979. The study concludes that no excess cancer deaths attributable to formaldehyde occurred. The working population, however, is generally healthier than the general population and certain sub-groups of the general population (very young, ill, aged) may be more susceptible to exposure to formaldehyde gas. Testing for the carcinogenic potential of formaldehyde gas via inhalation is inconclusive at this time. One model (2) estimates that a maximum of 89 and a minimum of 0 life time cancers would occur resulting from exposure of 1.75 million people in the United States to the U-F foam insulation in their homes.

As mentioned previously adverse health effects other than cancer are of concern.

The current occupational exposure limit for formaldehyde established by the Occupational Safety and Health Administration (OSHA) is 3 parts per million (ppm) averaged over an 8 hour work day. This exposure limit, originally adopted to protect against acute health effects, is currently being investigated to determine if it is sufficient to protect workers against irreversible health effects resulting from long term exposure. The National Institute of Occupational Safety and Health recommends reducing the standard to 1 part per million.

The Consumer Product Safety Commission found formaldehyde gas concentrations averaging 0.12 ppm in homes with U-F foam insulation and 0.03 ppm in homes without it. (These are below the industrial standard.) Other investigators found no difference between homes with and without U-F foam insulation. Another complication is that other building materials also contain formaldehyde based resins and may also give off formaldehyde gas. Formica counter tops made of particle board, and fiberglass insulation both use formaldehyde based resins as binding agents (3). Formaldehyde is also in some cleaning products, drapes, carpets, cosmetics and permanent press fabrics. These materials are fabricated in industrial settings under controlled conditions and are less likely to produce gas levels as high as improperly installed U-F foam insulation. U-F foam insulation is therefore the prime concern as a potential health hazard in homes.

Formaldehyde from Urea Formaldehyde Insulation in Monroe County

Monroe County (New York) Department of Health has found formaldehyde gas levels averaging 0.06 to 0.07 ppm in homes with U-F foam insulation in the walls and 0.12 to 0.14 ppm with the insulation in the ceiling (3). The higher levels occur in ceiling installations both because a thicker layer of foam is used and because rising hot air has a greater effect on the insulation in the ceiling than in the walls. The Health Department has also found average formaldehyde gas concentrations of 1 to 2 ppm in mobile homes with some units having concentrations as high as 4 ppm. (This exceeds the 8 hour industrial standard.)

In all the Health Department has examined about 120 houses and trailers, and roughly 50% had a detectable amount of formaldehyde in the air.

Identifying U-F Foam Insulation

U-F foam insulation is white or off-white in color and looks like hardened shaving cream. Fiberglass which looks like medicinal cotton only harder, and cellulose which consists of loose discrete particles are the other two materials used for insulation and they are easily distinguishable from U-F foam by visual inspection. Removal of a wall or drilling an observation port may be necessary to get to the insulation. Professional insulation companies are usually best qualified for this task. Once U-F foam has been

identified in a home the next step is to determine if formaldehyde gas is being evolved in sufficient amounts to create a potential health hazard. The Monroe County Health Department has personnel trained to test for formaldehyde gas whose services are available to the public. When this Bulletin went to press the service was free, but the Health Department is investigating the possibility of charging for the service*(3). Concerned persons can call the County Health Department Bureau of Air Resources to discuss their specific situation. If in the judgement of the Health Department a potential health hazard exists a representative will come to the home and take a one hour air sample. Sampling is usually restricted to the winter season because home heating and reduced ventilation increase the concentration of gas in the air. During the remainder of the year outside air circulated through the rooms reduces the concentration of formaldehyde gas in the house. In general, formaldehyde concentrations vary from day to day depending on the ventilation in the building.

It is also possible to use the 3M Company's Industrial Formaldehyde Monitor (4) and test the air yourself. This monitor is self-contained and the $35.00 price includes the monitor which can be used up to 8 hours, the laboratory analysis and a written report of the results.

Eliminating the Potential U-F Foam Insulation Health Hazard

The surest way to eliminate the potentail health hazard is to remove the U-F foam insulation. Removal from an attic is relatively easy; U-F foam insulation was not recommended for ceiling applications, but it has been used. Removal from outside walls is difficult and expensive (up to $20,000 because the walls have to be removed to gain access to the insulation). A less expensive method is to minimize leakage of formaldehyde gas to the interior. Caulk inside windows, doors and walls, paint the interior surfaces with special vapor barrier paints and gasket electrical outlets, switches and ventilation registers. The more complete the seal the better the remedy, but the Monroe County Health Department warns against a complete seal, because it is advisable to introduce some fresh air into a home even in cold winter months.

Concerns Related to U-F Foam Insulation When Purchasing a Home

The market value of a house may decrease if it is insulated with U-F foam. A potential home buyer should be aware that U-F foam is in the walls even if the insulation has not been a problem to the present owners. (The new or future occupants may have a greater sensitivity to formaldehyde gas.) The following precautions can be taken:

1. Through discussions with the seller, seek assurance that no U-F foam insulation was installed. Inspect the attic. U-F foam insulation was not developed for attics, but it might have been used. Remember that a seller may not be aware of what insulation was installed by a previous owner.

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* The Monroe County Health Department funding has been reduced and services that were once free now must be paid for.

2. The author included in his purchase offer a clause stating that the buyer has the right to have an inspection performed within a certain number of days of acceptance of the contract and if U-F foam insulation is found the contract is voided. His statement read:

> *"Buyer's obligation hereunder shall be expressly contingent upon satisfactory verification of seller's representation that such premises contain no Urea Formaldehyde insulation whatsoever. Buyer shall have seven days from the date of this contract to inspect the premises and verify the same at buyer's own expense. Having failed to raise any objection within such seven day period, buyer shall be deemed to have waived such contingency."* (7)

3. Have a professional insulation installer inspect the building. It may be possible to see the insulation by removing the grill to a heating duct or an electrical cover plate from the inside or the outside of the house. If this is not possible removal of an outside board or shingle or drilling an observation port may be required.

References

(1) Wolf Publications, Home Supplement, April 7, 1982, page 12, *"Is your house insulated with formaldehyde foam."*

(2) Chemical and Engineering News, March 29, 1982, page 34, *"Effects of foam insulation ban far reaching."*

(3) personal communication, Monroe County Health Department, Bureau of Air Resources

(4) Rochester Industrial Insulations, Inc., letter to customers, March 4, 1982

(5) Democrat & Chronicle, *"Real Estate observers unsure of market effect of foam insulation ban"* April 4, 1982

(6) BNA, Chemical Regulation Reporter, May 28, 1982, page 321, *"DuPont Study of Exposed Employees Finds No Excess Cancer Mortality."*

(7) personal correspondence, Christopher Werner of Burns, Suter and Doyle, attorneys at law, Rochester NY

(8) Rochester Gas & Electric Company, Customer Service Department