

# Felt Tips

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## Insulation Evolution

How does your choice of roof insulation affect the environment? Probably just thinking about the subject weren't you? Most likely not, but this *Felt Tip* will get you thinking [hopefully] about it.

In 1987, the United Nations Environmental Program reached an international agreement, called the Montreal Protocol, which placed controls on chlorofluorocarbons (CFC's) which are destroying the upper atmosphere's ozone layer. The ozone layer reduces transmission of skin cancer-causing ultraviolet light to the lower atmosphere. A global approach is underway to address issues to reduce ozone depletion, including reduction of CFC manufacture and use.

In response to the Montreal Protocol, the Bush Administration formulated plans in 1992 to eliminate CFC production in the United States by December 31, 1995. *Formulated* is the key word. CFC's are used for many construction products. Foamed plastic building insulations use them to create bubbles in the foam. When used this way, they are called "blowing agents".

American ingenuity was up to the task to meet the 1995 deadline. Manufacturers of CFC's developed various HCFC (hydrochlorofluorocarbons) formulations (they each have a number). HCFC's have hydrogen atoms which prevents chlorine atoms from breaking off from the molecule chain reducing the compound's reactivity. A recently completed two-year study, *Program for Alternative Fluorocarbon Toxicity Testing II (PAFT II)*, indicated that HCFC-141b has a low exposure toxicity.

In conjunction with positive feedback on issues like low flammability, compatibility with roofing materials, and acceptance by Model Building Codes and Insurance Standards groups, manufacturers started switching to HCFC blowing agents in building insulation. Manufacturers modified their equipment and manufacturing processes to produce new insulation foams. HCFC's are now available in large quantities. By October 1993, most roof insulation manufacturers will be using HCFC's with minimal impact on roof construction.

Cost change from the old CFC foams to the new HCFC foams is minimal, which is fortunate for consumers. [Who said that economic recessions can't produce something good? But read on, things aren't so rosy.] There is, however, a negative cost with the new insulations. [Now for the not so good news.] According to the manufacturers, insulating ability of new HCFC foam insulations is about 5 to 7 percent lower than old CFC foam insulations. [So the price doesn't change, yet you need more insulation to achieve

the same performance. More money, more money, more money.]

Also, nobody knows the long-term performance of the new insulations. Remember that old CFC-based insulations had R-Values which decreased with time, which were expressed as "aged" R-Values. HCFC foams are so new that there is no data for aged R-Values for them. R-value stability and physical durability/stability of the new foam insulation can be extrapolated from tests which simulate aging by subjecting materials to accelerated weathering and aging tests, but only actual performance will only produce truthful results. So time will tell, and caution should be exercised regarding results when specifying new foam insulations.

Another evolutionary issue is recycling to avoid landfill disposal of used insulation. Recycled foam roof insulation is now available. The National Polystyrene Recycling Company, formed in the late 1980's by a consortium of eight foam insulation manufacturers, set a goal to recycle 25 percent of the single service polystyrene foam used in the United States by 1995.

Other issues cloud the insulation evolution's future. [Now the really bad news]:

- ▶ A \$3.00 per pound (\$1.36 per kilogram) tax on HCFC's is being considered for commencement in January 1994.
- ▶ HCFC's supposedly cost \$1.00 per pound (\$0.45 per kilogram) to produce.
- ▶ Some manufacturers claim that there isn't enough incentive to recycle. [Would tripling the cost of foam insulation help?]

The insulation evolution will not be ending with use of HCFC's. HCFC's are probably only an interim solution. HCFC's do degrade ozone (although much slower than CFC's), so don't expect them to stay in use for a long time. How long is a side issue. To completely eliminate ozone depletion completely, a newer generation of blowing agents are being developed, but little specific information is presently available. [Did somebody say, "Trade secrets?"]

For further reading:

Architectural Specifier, "Polyiso Manufacturers Move Ahead with HCFC-141B," Spring 1993, page 72.

RSI (Roofing/Siding/Insulation) magazine, "HCFC-141B: A Sensible Alternative to CFC-11", February 1993, page 54.

Professional Roofing, "Recycling in Roofing: Here Today, Growing Stronger for Tomorrow", September 1992, page 26.

Contact Polystyrene Insulation Manufacturers Association or the National Roofing Contractors Associations' Environmental Action Task Force for a list of publications which address these issues.

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