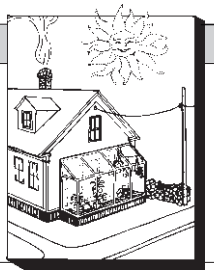
Woodstoves Clean Up Their Act



by Alex Wilson

The wood heating industry is undergoing dramatic changes right now. Lower oil prices have led to lower consumer interest in wood heat, which has hurt the industry. A lot of wood heat companies have dropped out of the picture. But there is another factor that will alter the picture even more. It will force more companies out *and* it will permanently transform the product itself. What the industry faces now are new Federal Environmental Protection Agency (EPA) emission standards, modeled on laws already in place in Oregon and Colorado.

The standards will be enforced in two stages. The first, to be implemented July 1, 1988, limits emissions from wood stoves to 9 grams per hour (g/hr) for noncatalytic stoves and 4 g/hr for catalytic stoves. The second, to be implemented two years later, reduces these limits to 7.5 and 3 g/hr respectively. Most quality "air-tight" wood stoves being sold today have emissions of about 30 g/hr. Emission measurements are made under controlled conditions, and like the EPA mileage ratings for automobiles the numbers may not have much bearing on what really happens in your house with your wood. But they will have a tremendous bearing on the look of the wood stove market.

New wood stoves manufactured after those dates must comply with the emission standards. Manufacturers then have a two-year "sell-through" period during which non-compliant stoves can still be sold. This means that the full effect of the regulations won't be felt until July 1990 and July 1992 (for the '88 and '90 standards, respectively). Stove manufacturers producing less than 2,000 stoves per year will have an additional one-year grace period for implementation of the 1988 standard.

Even with these extensions, we can probably expect the number of wood stove manufacturers to drop from 130 (where it is now) to 50 when the EPA regulations come into effect. (Eight years ago, there were between 800 and 1000 manufacturers or importers of wood stoves.)

In the July 1987 issue of *Alternate Energy Retailer*, editor Ed Easley reports that as many as three-fourths of all stove manufacturers have yet to market a product that's expected to pass the standard, and says "you can count the number of high-tech, non-catalytic stoves expected to be 1990-certified with your fingers." The March 1987 issue of *Wood •N• Energy* Magazine listed 49 wood stoves from 28 companies that meet the 1988 EPA standards. For the more stringent 1990 standards, 31 stoves from 21 companies comply. These stoves have not yet been certified by EPA, but independent testing shows that they meet the requirements.

Most quality stoves being sold today have emissions of about 30 g/hr, far exceeding the new EPA standards. The standards will change the look of the woodstove market tremendously.

Most of the certifiable stoves listed in Wood •N• Energy are using catalytic combustors, and most of the re-designs in progress include them (see "Nothing Lasts Forever" for more on catalytic combustors). The catalytic combustor burns the wood much more completely, sending less unburned particulate matter (smoke) up the chimney. Vermont Castings (Randolph, Vt.), manufactures the Defiant Encore, which has the highest efficiency rating of stoves manufactured in the U.S., and has a catalytic combustor. Another leader in the catalytic field is Woodcutters (Walla Walla, Wash.) with several Blaze King models already meeting the strict 1990 standards.

It's been a surprise to some wood industry observers that a few non-catalytic stoves have been designed which meet the EPA standards. These stoves are usually termed "high-tech" wood stoves. Presently, there are three U.S. companies with high-tech stoves that are expected to pass the 1990 test—Aladdin Steel Products (Coleville, Wash.), Brass Flame Stove Co. (Merlin, Ore.), and Heatilator, Inc. (Mt. Pleasant, Iowa). Eliminating the catalytic combustor from the stove lowers the initial stove cost and eliminates the need to replace the catalytic combustor when it wears out, so manufacturers are very anxious to pursue non-catalytic designs.

Bob Ferguson, Manager of Research and Development for Vermont Castings, the largest U.S. wood stove manufacturer, believes that once the pressure to produce compliant stoves is off, manufacturers will put more energy into non-catalytic designs and "do away with that set of tires which needs replacing."

Most of the high-tech, non-catalytic stoves on the market today have very small fireboxes and extremely low burn times. This won't be very acceptable to consumers and research is being conducted to correct these shortcomings. But this will take time.

What Does This Mean To Us?

For those of us *not* in the wood stove business, we'll be affected in different ways—both good and bad. We'll benefit most from improved air quality. As more and more of the stoves currently in use are replaced with stoves complying with the new regulations, we can expect to see improvements in air quality. This will be particularly noticeable in New England, where wood stove smoke often fills the valley pockets on cold nights. But the change will take a long time. Turnover of wood stoves is not all that rapid. And some of the non-compliant 30 g/hr models can be sold until 1991.

But the cost of wood stoves will rise. For catalytic models, the added cost is usually $200 to $300. The bottom end of the retail stove market will probably disappear altogether.

And wood stoves will be harder to find. Many hardware and building supply stores, which tended to carry the cheaper models, will probably drop out of the business.

NOTHING LASTS FOREVER

Nor are catalytic combustors meant to. In fact, that's been one of the major complaints about the component. They raise the cost of the wood stove in the first place, and new expense is incurred every time they need to be replaced.

New combustors typically cost around $100, retail, though some can be had for $50. The cost is high partly because the catalyst is usually made with platinum or palladium, both of which is very expensive. The platinum, palladium, or other metal is overlaid on a ceramic substrate. The unit assists the oxidation process, or catalyzes it. The technology has been around for years and is used in many branches of chemistry.

Corning Glass manufactures most of the catalytic combustors used in wood stoves (they are also the largest manufacturer of catalytic burners for automobiles). Panasonic and Applied Ceramics are the other two major manufacturers.

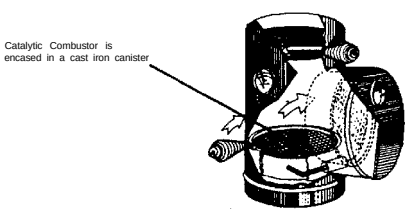
In general, the track record of catalytic combustors in wood stoves has been good. But, according to Bob Ferguson of Vermont Castings, they work best if they are designed for a particular stove. They work even better if they are the integral type as opposed to the type installed in flue pipe. All of the EPA-compliant catalytic wood stoves rely on integral rather than external catalytic combustors.

Catalytic combustors have not been trouble-free. Colored newsprint, glossy magazines, garbage, painted wood, and driftwood can damage or even destroy the catalyst. It's not unlike cars with emissions control. We had to switch to lead-free gas, or we'd destroy its catalytic converter. But car manufacturers were sharp—they built the entry into your gas tank too small for the leaded gas nozzle. Wood stove operators have to be self-regulating if they want to extend the life of their catalytic combustor as much as possible. Operating a stove with a catalytic combustor requires more diligence. The instructions and warranty should spell out how the stove must be operated. (Misuse will void the catalytic combustor warranty.) But basically catalytic-stove owners should avoid the following problems, as outlined by Ferguson:

- ***Coating or plugging up the catalyst.*** This is usually caused by glossy magazines or colored newsprint because the ash doesn't disintegrate readily. A hot fire will usually burn off the coating, allowing the catalyst to perform normally again. (People once worried that creosote could plug up the combustor, but this has not proved to be a problem.
- ***Damaging the ceramic substrate.*** A very hot fire can sometimes cause the substrate to crumble. This type of problem is more typical in wood-burning furnaces, and not so common in wood stoves. But if it does happen, the catalytic combustor becomes useless.
- ***Poisoning the catalyst.*** Heavy metals, chlorides, and halide can all do this. Heavy metals such as lead are used in some inks used in colored newspapers and magazines. Chloride and magnesium salts are common in driftwood. Once poisoned, the catalytic combustor is destroyed, and must be replaced.

Of course, even with proper use, catalytic combustors have a limited lifespan, and must be replaced. Corning's most common catalytic combustor is designed to last 6,000 hours. The more expensive model is designed to last 12,000 hours. Most wood stoves used for heating are operated 2,000 to 5,000 hours per heating season, so two to three years is the average life span for a combustor. ■

—Alex Wilson



Ultra-Burn (C & D Distributors Old Saybrook, Conn.) is an example of a retrofit catalytic combustor.

A few manufacturers predict that there will be less variety in stoves available because the design possibilities are fewer. But most manufacturers disagree. In fact, once the emissions hurdle is cleared, they believe they'll once again be able to focus their design dollars on aesthetics and features—something they'd already begun when the public's desire to save energy began to wane.

At least temporarily, consumers can benefit from the "dumping" of non-compliant wood stoves before the 1988 and 1990 regulations can go into effect. There will be dramatic savings on the older generation of stoves, including many of excellent quality. Of course, this won't do our air quality any good.

What About Fireplaces?

A big question that lingers in the wood-heat industry is whether or not open fireplaces will be regulated, and if so, when and how. Fireplaces are exempted from the 1988 and 1990 EPA standards and there are currently no plans to develop such standards. But no one is ruling out the possibility. Colorado has already passed a bill which mandates that fireplaces meet certain design standards after July 1, 1987 (a "design" standard focuses on the design rather than performance of the appliance).

Regulating open fireplaces would affect builders more than regulating wood stoves would. For one thing, over 65 percent of new houses include fireplaces. Enforcing it would probably require builders to get fireplace plans approved before construction.

But fireplaces do not produce as much pollution as wood stoves. According to *Wood •N• Energy*, open fireplaces represent 42 percent of the residential wood combustion appliances, but contribute only 14 percent of the pollution. Because fireplaces operate at a much higher burn rate and with a great deal more excess air, their combustion is more complete, and they throw less pollutants into the air, than do slow-burning wood stoves. This fact, and the problems with enforcing a fireplace emissions standard, will probably keep the fireplace off the hook, at least for a while. ■

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