

Use and care of woodstove catalysts.....

Starting from a cold stove, the by-pass damper to the catalyst should ALWAYS be open. Build your fire and light it, leaving the by-pass damper open. Closing the damper prematurely causes the unburnt smoke and ash to pass thru the catalyst honeycomb before the catalyst has reached its "light off" temperature, and leaves a layer of soot and ash on the active catalytic surface, which is not good, as it will "mask" the surface.

As to materials to start your fire, it used to be said to avoid the ad insert sections and colored sections of newspapers, or glossy magazines, as those things have colored inks that could contain chemical poisons to the catalyst and make it become inactive. However, in recent years the colored ink in newspapers is soy based and perfectly fine to use. Magazines, maybe not so much, and you are better off avoiding using them. Firestarter sticks or logs, I would also avoid, as they can also contain chemical components that are catalyst poisons (more on that later.) And don't even ask me about the CSL (Chimney Sweeping Logs)....as much as they may say they are safe for use with catalysts, DON'T BELIEVE IT! Same with those Duraflame logs and such.

Once the thermometer at the catalyst (and there SHOULD be one, if your stove doesn't have one, the stove design SUCKS and don't buy that stove.....if the one that came with the stove has gone missing or is broken, be sure to get a new one) has reached about 300-400 degrees, you can close the by-pass damper, as by then the catalyst will have "lit off" and will start catalytic burning the soot, ash, and pollutant gases. You may or may not see the ceramic honeycomb start to glow thru thermometer probe hole. Usually they will glow when they first light off and for awhile after, but don't be alarmed if they don't....that **doesn't** mean they aren't working. Once the by-pass is closed, the temp at the catalyst will rise fairly quickly.

With catalytic stoves, it is best to burn them between 700-1000F at the catalyst thermometer probe, so once it reaches those temperatures, you need to set the air dampers to keep it within that range. Going over about 1200 degrees can cause crumbling or cracking of the ceramic honeycomb, and/or cause that beautiful surface area I talked about in the previous post to collapse, making the catalyst less efficient. IF by chance it goes over 1200, don't panic, as the catalyst can endure occasional temperature spikes with no ill effects, but it is not something you want to happen on a routine basis. Just try to damper down the stove to acceptable ranges slowly so as not to cause thermal shock to the catalyst. And NEVER run your stove with the ash clean out door open, as that causes very hot fires and going over the 1200 F limit.

Many stoves have a main chamber air damper and a catalyst chamber air damper. You need to balance the two so that you run in the proper operating range. But keep in mind that the damper for the catalyst chamber should never be fully closed. After all, "burning" is nothing more than combining fuel with oxygen, so if you starve the catalyst for air, there isn't enough oxygen around to fully burn the fuel, and even a catalyst can't compensate for that. And remember that ash, soot, and the pollutant gases (CO and Hydrocarbons) are nothing but incompletely burnt fuel, and that is energy that is going up your chimney instead of heating your house.

So you need to balance the air flow dampers such that you get enough oxygen to the catalyst without cooling it off, yet not so much to the main chamber that your fire

burns very hot (which also wastes fuel.) Those particular setting are going to vary from stove to stove.

When it comes time to re-load your stove, always open the bypass damper before opening the access door. Reload the stove, close the door, then close the by pass damper. The catalyst temp will drop during this time, so be sure to monitor it for a few minutes to be sure it comes back up to acceptable temp, and make any air-flow adjustments as necessary.

Above I mentioned catalyst poisons.....there are 3 types.....Chemical poisons that are irreversible and will kill your catalyst for good, chemical poisons that are reversible and can be removed, and "masking agents " that can also be removed.

The irreversible chemical poisons are heavy metals, the most common of which are lead, zinc, and arsenic. (This is why we have unleaded gasoline, as you car also employs a catalyst, and lead in gas will kill it.) Obviously NEVER burn these things or things that contain them in your catalytic stove. This would include wood that may contain galvanized screws or nails, as they contain zinc. Arsenic can sometimes be found in glossy colored print such as magazines. Older pressure treated wood also contains arsenic. Also, many people will use old pallets as firewood. While that may be okay, you have to be careful as to what those pallets may have previously transported and could be stained/soaked with.

Reversible chemical poisons include things like phosphorous, sodium, chlorine, fluorine, calcium, silica, and a few others. They can be removed and rejuvenate the catalyst using a method I will describe below.

Masking agents are soot and ash and anything else that may physically cover the active catalytic surface as opposed to the chemical poisons that chemically interact with the catalyst materials. These can also be removed to make your catalyst perform better.

So, it comes time to "clean" your catalyst. How often will vary depending on how much you burn your stove, how you burn your stove, and what your burn in it.

First, you need to get access to remove the catalytic element. This is gonna vary from stove to stove, but there should be instructions on access in your owner's manual.

Once you get access, ALWAYS handle the catalyst gently so as not to drop it, knock it, or otherwise cause the ceramic to break.

First thing you want to do is take a vacuum cleaner or a shop vac outfitted with the brush attachment and lightly vacuum of any soot or other loose material from both faces of the catalyst. DO NOT use high pressure air to blown out the cells of the ceramic, and NEVER use something like a bottle brush or gun cleaning brush to rub out the inside surface of the cell walls....in doing so, all you are doing is abrading off the active catalytic coating. (We once had some guy send use back a catalyst for warranty replacement, and his note said "*Yeah, I took the brush I use to clean the barrel of my shot gun and I cleaned out every cell in the honeycomb. And it STILL doesn't work!*".....Well, gee, and you wonder why, you dope!

Next step. Get yourself an old pot (not one you use to cook with) that will fit the

ceramic honeycomb in the bottom. Put in some DISTILLED water (not tap water, as that can contain fluoride and chlorine, among other things that are catalyst poisons), and add twice that amount of white vinegar, so that there is enough to totally cover the catalyst. Bring that solution up to a boil, then shut it off. CAREFULLY place the catalyst in the pot and let it sit for about 5-6 hours. This will strip away the catalyst poisons and masking agents, but not hurt the active catalyst chemicals.

Remove the catalyst from the pot, gently shake it to remove the excess solution. Toss out the cleaning solution, and refill the pot to the same level with distilled water, and let the catalyst soak in that for an hour or so. Repeat the rinsing step twice more.

Then place the catalyst in your oven on about 300 for a couple hours to dry it out.

Once dry, re-install it in your stove, and then build a low fire and burn that on low fire for a few hours to further dry out the catalyst. Then you are good to go.