THREE TYPES OF CLEAN BURNING STOVES

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Dec 18, 2009

In the mid-1980s, researchers and wood stove appliance designers began developing cleaner burning technologies by promoting complete combustion within the stove box. This entails creating three simultaneous conditions: high temperature, enough oxygen, and time for the combustion gases to burn off before entering the chimney.

We now have three main categories of highly efficient technologies to choose from: advanced combustion, catalytic, and densified pellet systems.

Advanced combustion systems have the following characteristics:

- Firebox insulation to keep temperatures high
- Primary combustion air that is preheated so that it doesn't cool the fire
- Preheated secondary air that is fed to the fire through sets of small holes in the gas-burning zone, above and behind the fuel bed
- Internal baffles that give the gases a long and hot enough route so that they can burn completely.

Vancouver Island is home to Pacific Energy, one of the first innovators of this technology.

Catalytic stoves are built to send combustion smoke through a coated ceramic honeycomb-shaped device that is located in the top of the firebox, just inside the door. The catalyst in the coating consists of a combination of one or more precious metals, including platinum, palladium, rhodium and cerium. The catalyst chemically lowers the combustion temperature of the smoke from a wood fire, thereby allowing more smoke to burn. The result is a highly efficient unit with extremely low emissions. In order to maintain these advantages, the catalyst needs to be replaced every 6 to 10 years.

One of the most popular catalytic stoves in BC is the Blaze King. It has a very large, deep firebox that can produce burn times of well over 24 hours from a single load of wood.

Pellet systems use dried ground wood or other biomass waste that is compressed into small cylinders that are about 1 inch long and ¼ inch in diameter. The pressure and heat created during their production binds the pellets together with the lignin in the wood. No other binders or additives are used.

Pellet burners consist of a screw auger that automatically feeds pellets at a controlled rate from a hopper (holding 40 to 100 lb of fuel) into the combustion chamber. The feed rate matches the amount of combustion air introduced and, if properly adjusted, can lead to lower emissions than natural wood appliances.

Pellet stoves rely on three to four electric motors that need to operate under high temperatures. The best systems are ones with high quality, low noise motors that do not consume a lot of electricity.

If you are heating your home using a wood stove made before 1994, consider buying one of the systems described above. The air quality in and around your home will be greatly improved; you will need far less wood per season; and you will enjoy the more stable, radiant heat from a flame you can watch through the ceramic door window – a standard feature of all newer models.