

## WOOD as a Fuel.. DO's and DON'TS

When firewood burns, it breaks down to its components. Its moisture content evaporates. The oils in the wood vaporise and become volatile gases. Black carbon and other particles mix with the gases in smoke. The logs become a glowing mass of charcoal. Finally there remains ash, a mix of fire-resistant, mineral-rich dust.

When wood burns slowly, at a low temperature, incomplete combustion results. The oils in the wood vaporise but the resulting carbon-rich gases fail to burn. Instead they rise up the chimney as smoke.

Consequently:

- 1) Much of the firewood's heat is wasted.
- 2) The smoke pollutes the neighbourhood and the environment, causing health problems.
- 3) If the chimney cools to below **250°F** the gases in the smoke condense into a liquid, combine with water and black carbon, and form creosote.

Creosote is smelly, black, corrosive and flammable. It may run down inside chimneys and stovepipes as a dark goo that oozes out of cracks and joints. As a solid, creosote forms a hard, glass-like, difficult-to-remove coating on the inner surface of the chimney. Or it can form soot, a fluffy mess that plugs the stovepipe and chimney. Over a heating season creosote can build up to a layer several inches thick. The problem feeds on itself:

**The fire in the stove is deprived of draught,  
so the burn slows further, creating more creosote.**

To prevent creosote from forming, we must either keep the chimney above 250° F all the way to the top, or burn up the gases liberated from the burning wood before they can reach the chimney. Keeping a whole chimney hot would, of course, waste huge amounts of energy. Modern stoves recirculate the gases or use catalytic converters. Either way they burn up the smoke within the stove and capture the heat produced. You can achieve the same result regardless of the type stove you have:

**The key is to burn hot fires..but do so with care.**

Paradoxically, to avoid creosote formation we must burn our wood fires hot. On the other hand, a hot fire in the stove with the air control wide open may allow hot oxygen into the chimney, where it can ignite the creosote, causing a chimney fire. The whole building may catch on fire if the hot chimney ignites combustible materials or sparks land on a combustible roof. Since creosote buildup restricts flow, which slows the smoke on its way out, allowing more time for it to cool and more creosote to condense, restricting the flow further, a clean, properly maintained chimney with a good draught is a prerequisite of safe wood-burning.

Chimneys should be inspected at least once a year and cleaned of creosote as needed. Flues quarterly when in use **especially thatched properties**

## Choose Your Firewood Wisely!

Pound for pound all species of wood have about the same energy content, but less-dense softwoods burn faster and leave less charcoal than dense hardwoods. The moisture content of firewood matters more than the species..do not burn green, wet wood.

Fresh-cut wood should season at least over the summer, even longer for some dense hardwoods, to dry to 20% moisture preferably less.

### This is important!

Water in firewood turns into saturated steam as the wood burns. It enters the stack as a mix of steam and water droplets at a temperature of around 212°F the boiling point of water. This is considerably cooler than 250°F the point where creosote-forming gases in the smoke condense. So boiling off excess water from wet firewood literally cools the chimney, helping gases condense into creosote, regardless of the species of wood being burned. A tell-tale sign of a slow fire is a smoky chimney; a good, hot fire produces no smoke.

It is best to start each day with a roaring softwood fire. It will quickly heat up the house chilled during the night. (If the house chills down too much overnight, you have a leaky, under-insulated house, a problem no wood fire can fix.) A hot fire will burn out any creosote that may have formed overnight. If done every day and carefully controlled, this morning burn-out will present no hazard. If, however, the creosote is not burned out every morning, it will quickly build to where it is dangerous to start a hot fire. Then the only safe thing to do is to take the stovepipes apart and clean them, along with the chimney.

Traditional fireplaces and wood stoves produced hot, roaring fires which had to be stoked to keep the house warm. They either burned the creosote before it could accumulate or kept the chimney temperature above 250°F so that the smoke escaped without its gases condensing. The burn was controlled by the amount of wood in the stove.

Then airtight stoves hit the market, promising to save wood and allow for restful nights without the need to get up and feed the fire. “Just fill it with logs, choke down the air for a long, slow burn, and wake to a warm house in the morning” — so the story went.

### There is only one problem....

**An air-starved, slow burn in the stove produces cool stack temperatures, ideal conditions for creosote to form.**

Airtight stove or not..DO NOT.. slow the burn by starving it of air in an attempt to make a fire last longer. Hardwoods will burn longer and leave a good charcoal bed from which the next fire may be started. It is better to let a full-load fire burn down to hot coals and start a new, hot fire than to keep a slow fire stoked a log at a time. In short, burn a series of controlled, but hot, fires all day as needed, letting them burn down to hot coals. Then build a hot evening fire of hardwoods for the night and let it burn out **WITHOUT** turning the air controls down.

For more tips & advice visit <https://www.burnright.co.uk/>