



For safety.
For the environment.
For chimney sweeps.
For the consumer.

WHAT TO BURN? THE SOLID FUEL **MINEFIELD**

Wood burning stoves environmental guidelines.

A large, dark green, textured paper is torn horizontally across the middle of the page. A vertical strip of the same paper is also torn, creating a jagged, torn-paper effect that reveals the white background underneath.

MYTHS & FACTS

There are several fuel types available to the solid fuel user, coal, peat, wood logs, compressed wood products, smokeless coals etc.

With so much negative info in the press let's take an objective look which is the right fuel for you to burn.

Firstly you must look at your appliance, follow manufacturer guidelines as burning the wrong fuel type can be dangerous and at the very least invalidate your warranty. If your chimney sweep is a registered professional it would pay to listen to them, generally sweeps are a hive of knowledge.

If you care about the environment, and you should, then you must focus on renewable fuels such as wood logs.

Selecting and purchasing wood logs

Ash and beech are some of the best wood logs to burn however most logs burn perfectly well if they are dry enough and have been adequately seasoned.

Wood should be purchased from a reputable supplier who will have to comply to regulations and a vested interest in planting more trees to replace what has been felled.

Wood logs must have less than 20% water content when they are burned. You can ascertain this several ways the easiest and probably most reliable is to purchase logs approved by Woodsure who will have done all of the eco checks and tested the moisture content in random batches. You will also be able to complain should the wood you purchased was too high in water content.



If you chose to purchase unseasoned logs then you must season them (typically for two years or more) after seasoning you must test the moisture content with an electrical conductivity moisture tester prior to using them, if they're still wet it's back to the seasoning pile. Again a moisture content of below 20% is required for efficient combustion and to prevent excess soot, increased risk and unnecessary environmental impact.





Users burning wet wood are one of the biggest problems and challenges our industry faces however it's one of the easiest fixes too.

Why is mixing fuels a problem?

Wood and coal burn quite differently. Wood burns through a process of gasification where the volatile oils within become heated, turn to a gas, mix with oxygen above the log and eventually combust.

Coal on the other hand is primarily a carbon burn where oxygen must enter and mix from below the fuel as combustion takes place inside and not above the coal itself

There are distinct differences between the two types of appliances

Let's look at some of the issues associated with the incorrect use of fuels

1/ Wood on top of coal

If we try to burn wood above a bed of coal we will need to open the top air intake drawing air above the coal and not through it. When this happens the coal which is burning poorly produces high levels of carbon monoxide and carbon dioxide, in doing so our wood gasses which should be bathed in oxygen are now shrouded in the same fire suppressant that is in the black fire extinguishers. The affect is compounded by the adequate heat from the coal, what happens is that the wood pyrolysis in the heat, volatiles hydrocarbons are emitted and become gaseous. Normally these hot gasses mix with oxygen and burn with the yellow flame we associate with wood however in the reduced oxygen environment above a coal bed the volatile gas emitted by the wood log will travel into the chimney where it will deposit as flammable creosote. The final issue when combustion temperatures and oxygen levels are too low is the later hotter stages of gaseous combustion will not effectively take place. During these later phases carbon soot particles should be burned, if they are not they will exit the chimney as fine dust pollution harming our air quality and shortening our lives.



2/ Coal on top of wood

We now understand that coal requires oxygen from below to burn effectively, think bellows in a foundry. If we burn wood below a coal bed we will have a situation where our coal is bathed in carbon dioxide leaving an incomplete burn. The second issue here is that wood produces lots of ash which in turn blocks the riddle grate further lowering the amount of available oxygen to the coal. If the coal used is smokeless coal then high levels of sulphurous compounds will also be emitted, these compounds are highly corrosive and will eat through stainless steel liners in no time. The one exception to the wood underneath coal scenario is kindling a fire with wood where it is very likely that the air intakes or even the door will be open in order to provide enough oxygen for both fuels for a limited time.

Historically blacksmiths used a below to pump air below the coal. Nowadays they inject neat oxygen or use a pumped fan of powered bellows.

3/ Slumbering

The term slumbering relates to the user loading the already burning appliance and then closing down the air supply in an attempt to make the fire burn for long periods, typically overnight.

There is a huge problem here and that is the fact that fuel requires oxygen for combustion. There are several results that occur when oxygen is limited in a combustion reaction, I'll list a few.

1. Much of the volatile content within the fuel is emitted due to the heat but it does not combust, it rises up the flue coating the chimney with volatile fuel and greatly increases the risk of chimney fire and the requirement for sweeping, Many of the unburned hydrocarbons exit the chimney as smoke and pollute our planet.
2. Carbon requires lots of oxygen add heat for the particles to combust. When the oxygen supply is limited, dangerous pm2.5 and pm10 sized carbon particles are released. Many of these particles make it to the outside air as fine dust pollutants causing health problems such as respiratory and lung diseases.
3. Heat or lack of. In order for a fuel to release its stored heat, it must react with oxygen. Oxygen is the catalysing agent within the combustion reaction.
4. Cost.
Slumbering will shorten the life of stainless steel liners, increase the need for servicing, sweeping and maintenance and reduce the heat value that you should get from the fuel making it less cost effective.



To conclude...

Ideally you will burn only dry wood logs in an environment that has adequate air for moderate flaming combustion.

Adjust the air supply so that flames are not sucking up the chimney but doesn't limit it too much. Smoke should not be visible in the firebox, only fire.

Add as much fuel as is needed to fill the fire box with flames, burning too much or too little fuel at a given time is another avoidable we can negate.

You can ask your professional chimney sweeps for tips on fuels and how to achieve moderate flaming combustion, fuel storage, type, sweeping frequencies and many other important factors surrounding burning practices.



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