



Stove & Fireplace Advice

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WOODBURNING AND MULTIFUEL STOVES

TYPES OF STOVE

There is a wide range of stoves available today designed to burn solid fuel, wood or both. Stoves can be either freestanding on the hearth or inset into the fireplace recess. Traditionally, wood burning and the upright coke burning appliances were freestanding and are known as stoves. Inset solid-fuel burning appliances, often with back-boilers are known as room heaters. Stoves can be constructed of cast iron or sheet steel or a combination of both. Provided the sheet steel used is of equivalent thickness to cast iron, there is little to choose between the two materials in terms of heat conducting properties. Cast iron stoves do, however, tend to be of heavier construction than steel ones and will therefore tend to hold their heat longer.

Cast iron can embody detailed relief and mouldings giving the designer wide scope for decoration and ornament. Cast iron stoves, however, have to be made in panels, bolted together and sealed with gaskets or fire cement. These joints can open in time and need resealing to keep the stove air-tight and controllable. Cast iron is a brittle material and given a sharp blow or a sudden thermal shock, such as spilling liquids on it when hot, can cause a panel to crack.

Sheet steel stoves can be constructed by folding and welding the seams, making for a very airtight design. Sheet steel will not crack with rough treatment, but can buckle or distort if not designed correctly or if the stove is over-fired. Sheet steel stoves are generally plain in design and the material is favoured in the canopied styles. Many manufacturers use a body of sheet steel with cast iron for the doors, grate parts and other fittings. The development costs for a sheet steel stove are relatively low, whereas cast iron requires expensive patterns and moulds to be made, making the unit cost higher unless large quantities are produced.

WOOD-BURNING STOVES



Wood contains much higher proportions of volatiles (around 50% of the fuel value) than solid fuel. Wood therefore burns best on a bed of ash with air supplied from above. Wood only produces about a fifth as much ash as solid fuels and therefore ash only needs removing from a wood stove around once a week. It follows therefore that a grate is not desirable in a wood stove. Many wood stoves do in fact incorporate an ash pit but the grate above it has only a few small slots or holes to allow a small percentage of ash to find its way through while still retaining a good bed of ash for the logs to burn on. The ash pan will need emptying about once a week.

The high volatile content of wood will, if not burnt (flames are the volatiles burning) condense inside the stove and rapidly blacken the glass in the doors. To overcome this problem, many stoves incorporate a system known as 'air wash'. Air is ducted round the hottest parts at the top of the stove and then fed in along the inside top edge of the glass panes in the doors, whence it is pulled down into the fire bed. This wash of very hot air keeps the glass almost clean if operated correctly. Some designs also use double glazing to reduce tar forming on the glass.

'Clean-burning' wood stoves use additional secondary or even tertiary air fed through a double-walled baffle for improved secondary combustion (e.g. to burn more of the volatiles which would otherwise be left in the smoke exiting up the chimney). In order to minimise the emissions of polluting volatiles and particulate matter, UK smoke control legislation dictates that that only models approved by DEFRA can be sold for wood-burning within the UK's designated smoke control areas. A list of models which are approved for burning wood in smoke control areas appears on the web site <http://www.uksmokecontrolareas.co.uk/appliances.php>

For best results there are two important rules for operating a wood stove:-

1. Burn only dry seasoned logs that is logs that have been felled and stored under cover for at least a year and preferably brought into the house a week before burning. Seasoned logs typically have cracks radiating from the centre when viewed at a log's cut end.
2. Run the stove hot (with plenty of flames) for at least half an hour after each fuelling and before shutting down for a long period of slow burning, i.e. over night.

MULTIFUEL STOVES

A multifuel stove is capable of burning either wood or solid fuels (specifically smokeless coals). Solid fuel demands a good riddling grate mechanism and daily de-ashing while wood requires an ash bed to burn on and only weekly de-ashing. Thus the design of a successful multifuel stove is a compromise between these requirements. Some stoves will have additional parts to be put in or removed when changing fuels, but the true multi-fuel stove should be able to burn both fuels together or separately without complicated swapping of components. Firebox size will inevitably be a compromise, being a little larger than necessary for solid fuel and smaller than desirable for wood.



BACK BOILERS

Back-boilers, so named because they are positioned in the back of the firebox behind the fire, come in two distinct types. Most designs now wrap-around the sides and top of the fire box and produce enough hot water to heat a number of radiators in addition to domestic hot water. Rated outputs are generally available from 5.5 to 13 kW (20,000 - 45,000 Btu/hr). These boilers must only be connected to indirect heating systems.

Unlike gas or oil boilers which cycle on and off as heat is demanded by the thermostats controlling the system, solid fuel stoves are burning and therefore generating heat all the time. It is therefore necessary to dissipate this heat continuously or the boiler will over-heat and literally boil. Therefore some heat must circulate to the hot water cylinder and possibly one or two heat-leak radiators by gravity all the time, without relying on an electric pump. (It is good practice to allow about 20% of the boiler's output to circulate by gravity). A fully pumped heating system is not therefore suitable and some gravity circulation must be incorporated for safety in the event of a pump failure or power cut.

'Link up', as the name implies, involves linking a back- boiler into an existing gas or oil fired central heating system. The idea is to provide additional heat to the system and to give greater fuel versatility. A high output back-boiler can be linked to the whole heating system and may be capable of running all or part of the system without the gas or oil boiler. There are two ways of installing this type of link up. The first uses a series of electrically operated valves and thermostats, which can be bought as a pre-plumbed and pre-wired panel. The other uses a neutralizer. This is basically a small tank through which all the flow and return connections are made. Both systems need careful designing by an experienced heating engineer. Link up is not suitable in all houses, and depends upon the relative positions of the existing boiler and the hot water cylinder.

Using back-boilers in wood burning stoves needs extra care as tars will condense on the cool boiler surfaces. This is particularly likely round the base of the boiler, when the fire has died down but the pump is still running. It is therefore advisable to install a low limit thermostat on the return pipe into the base of the boiler. This is set to switch off the pump if the returning water temperature drops below 45°C. Early boiler failures with woodburning stoves are usually due to corrosion eating in from the outside of the boiler jacket due to this problem. Conversely, a high limit thermostat should be installed on the flow pipe near the top of the boiler. This is wired to turn the pump on to disperse excessive heat round the system should the stove be running too hot. This is an important safety feature as otherwise the hot water from the taps could reach scalding temperatures or even boil.

HEARTH & CLEARANCES

The requirements for hearths are laid down in the Building Regulations 2002 (2006 amendment) – Approved Document J. They are basically the same as for an open fire and fall into two categories.

1. Installation in a fireplace recess. The hearth must extend 500mm (20") in front of and 150mm (6") beyond each side of the fireplace recess.
2. Freestanding appliance. The hearth must not be less than 840mm x 840mm (33") square. The appliance must be placed no closer than 150mm (6") from the back or sides of this hearth.

The hearth, including any decorative hearth superimposed on it, must be at least 225mm (9") in front of the appliance if there is no open-able door, or 300mm (12") if there is an open-able door (this includes a side opening door). Hearths must be 125mm (5") thick which may include the thickness of a concrete floor and the thickness of any tile, stone or marble surface. Timber under a hearth must be at least 250mm (10") away from the top surface of the hearth, but it is permitted to support the edge of the hearth on timber, as in a first floor situation. Where a stove is sited against a wall and not in a fireplace recess, the wall must be constructed of non combustible material and must be 1200mm (48") high and/or extend 300mm (12") above the top of the stove, whichever is the greater.

Single wall flue pipes connecting a stove to the chimney should be three times the diameter of the pipe (3D) from any combustible wall or beam (as in an inglenook fireplace). This distance can be halved if a heat-shield is placed between the beam and the flue pipe. Heat shields must be spaced at least 12.5mm (1/2") from the beam and be 3D wide.

CHIMNEYS

For solid fuel burning (wood or 'coal' fuels) appliances, a masonry chimney previously used for an open fire and having a 225mm x 225mm (9" x 9") brick flue or a lined flue between 185mm (7 1/4") and 225mm (9") diameter should be satisfactory.

For wood burning, a lined and well insulated flue is essential if tars and condensates are not to be a problem, leading to brown stains coming through the wall or, at worst, a chimney fire. Chimneys should have an absolute minimum height of 4.5m (16') and terminate above the roof ridge or other tall building, tree or hill within 20m (60') to be clear of any possible downdraught. Chimneys should be swept at least once a year for solid fuel appliances and at least twice a year if wood is being burnt. The N.F.A. recommends using a sweep who is a member of the National Association of Chimney Sweeps (N.A.C.S.) <http://www.nacs.org.uk>

AIR SUPPLY

All fuel-burning appliances require an adequate supply of air to provide oxygen for combustion and to vent the products of combustion up the flue. This air generally comes from the room in which the stove is sited and must be replaced from outside. Building Regulations Approved Document J1 requires that all heat producing appliances shall be so installed that there is an adequate supply of air to them for combustion and the efficient working of any flue. As many appliances can be operated with the fire doors open, it is prudent to provide ventilation in all circumstances. (Appliances designed to work with the fire door closed only require an air vent if the rated output is over 5 kW.) Any householder smelling fumes in a room with a stove burning should immediately let the fire out and open doors and windows to provide ventilation. Professional help should be sought before the appliance is used again.