

S-J'S BEGINNERS GUIDE TO BOILERS IN STOVES

This is not by any means a really techie guide - nor does it teach you how to plumb. It's just a basic layman's guide to types of boilers in stoves. Hopefully this guide should help you determine IF a boiler in a stove is suitable for you, and if so.... What type.

Whatever you decide, always discuss with your plumber as to the suitability with your current heating system before purchase. I'm a solid fuel engineer (dry systems), but although I know a fair bit about boilers in stoves I am NOT a plumber and cannot assess your system.

THE THREE MAIN TYPES OF BOILERS.

WRAP AROUND - a wrap around boiler is usually a big sealed boiler unit with cast iron panels strapped on. The fire is contained within the middle of the boiler unit and heats the water all round. This type of boiler produces the HIGHEST amount of hot water, but gives the least amount of heat to the actual room itself.

Water is constantly being heated. The cast iron body of the stove is not being directly heated by the fire and never truly gets REALLY hot. Therefore, this type of boiler STORES the least amount of heat in the actual stove itself and cools down very quickly. It is most suited to those houses where a high level of hot water (to radiators or hot water tanks) is required. The trade-offs are that it is not so efficient in fuel consumption, cools down quickly and if the boiler goes, often the entire unit can be a bin job. Plusses are that heat to the room is minimal (for smaller rooms), high hot water output. This type of boiler is commonly found in AGA's and RAYBURN's amongst other brands.

50 : 50 SPLIT - an integral steel boiler fitted into a stove which goes up the back of the stove inside the firebox and then also slopes forward and does the job of a baffle. This type of boiler can either be FACTORY FITTED or sometimes RETRO FITTED.

Most of our larger boiler options that we fit on site before despatch are what we call 50 : 50 split boilers. The boiler fits inside the firebox of the stove and replaces the back protective lining panels. It takes up approx 20% of the internal fire box of the stove. This causes a reduction of heat output to the room of approx 20% compared to the non boiler version of the same stove. However, the amount of water capacity heated by the stove via the boiler becomes almost identical to the maximum heat output left to the room. Ie - 12kw to the room with no boiler, 9kw to the room after boiler fitting - BUT also 8kw to the water.

Like the other boilers, it is directly heated by the fire. Although as the boiler only runs up the back of the stove and partially over the top on the inside, the cast iron stove body is being directly heated by the fire and stores the heat in the same manner as a storage heater. For this reason, stoves with the 50:50 split type boiler and the HORIZONTAL type boiler are more economical in terms of heat storage and fuel consumption. Plusses - replacement 50 : 50 type boilers are easy to refit if required

without scrapping the entire unit.

HORIZONTAL PLATE - AS far as we know, this type of boiler is unique to Natural Heating. This type of boiler gives the LEAST amount of hot water (for 3 > 4 rads or a standard hot water tank). It is found to be very desirable with customers living in boats and caravans, those with small holiday cottages - or for those wanting to cut down slightly on general heating bills whilst minimising installation and fitting costs.

Inside a typical stove, you will find a Baffle plate. A baffle plate sits above the fire box, generally at an angle. The purpose of this part is to contain the fire (and associated heat) directly in the stove itself and prevent the flames and heat simply disappearing straight up the chimney.

When we fit a HORIZONTAL type boiler, we permanently remove this baffle plate and re-fit the boiler in it's place. The horizontal boiler then does the exact same job as the baffle plate, whilst producing hot water as a by product. This type of boiler takes up no actual fuel loading / fire box space so does NOT reduce heat capacity from the stove to the room. It is very easy to replace should this ever be required.

Downside is that this type of boiler is that it can only provide a small amount of water - but it has many plusses. No drop in heat output to the room despite the addition of a boiler, high efficiency as all the heat is stored in the cast iron stove body, easy to replace, can be capped off if required.

CAPPING OFF - this is something we can only do with HORIZONTAL PLATE boilers. If you are buying a stove with a boiler, it is important that you ONLY use the stove after the boiler / plumbing has been commissioned. Running a stove with a dry boiler could cause damage to the boiler, the stove or both. Long term, should you wish to have a small boiler fitted - but want to use your stove short term without the boiler, CAPPING OFF is for you.

This means that we would take the baffle plate out of your stove and specially cut the holes to suit the boiler in the stove body. The holes are then capped off with very large bolts, nuts, washers and fire cement and made air and smoke tested. The baffle is refitted. This procedure is much trickier to do than simply removing the baffle plate and fitting the boiler. The benefits however are great. The stove can be used without the boiler for an indefinite amount of time without any detrimental affect on the appliance. As soon as you are ready to plumb the boiler in, the baffle and capping off fixings can be removed without un-installing the stove. The HORIZONTAL PLATE boiler will then simply slot in and the boiler fixings are done up from the back of the stove.

This procedure does require additional work for us to do so, so should you want your boiler capped off, we do now charge £10.00 for this service.

IS A STOVE WITH A BOILER SUITABLE FOR YOU ?

If you have an existing heating system, and wish to integrate a stove the following are some of the first things you need to check out.

If heating hot water - ie for baths etc and not just radiators, check that the hot water tanks is INDIRECT and that the system is OPEN VENTED. An EXPANSION TANK is required. Stoves with boilers CANNOT be added into pressurised systems, and I would not recommend them for DIRECT use either. A more info explaining open vented and pressurised systems can be found here :

www.diydata.com/planning/central_heating/boiler.php

Some pressurised systems can be converted to open vented. To combine stoves with boilers and combi boiler central heating systems, often a DUNSLEY NEUTRALISER is used... though there are other ways of achieving similar results. Dunsley's website gives much more information and also link up drawings for plumbers.

<http://www.dunsleyheat.co.uk/linkupsys.htm>

Adding a stove into an existing heating system is not always practical due to location of pipes and plumbing costs. Do get the job priced by a recommended plumber before deciding if a boiler stove is for you.

There is also a good document to be found on the Solid Fuel Technology Institute website which has some nice pictures ! <http://www.soliftec.com/CentralHeating.pdf>

WORKING OUT YOUR REQUIREMENTS

Ok - so you've decided you want a stove with a boiler to either replace or supplement other forms of heating.

In my opinion the first most important rule is DON'T GET CARRIED AWAY BY SIZE. This is where a vast amount of people go wrong. It is not all about buying the biggest appliance you can afford. An excess of hot water - to either hot water tank or radiators (or both) can either be very inefficient or very, very dangerous. Over production of hot water could result in bursting of pipes and spewing of boiling hot water. See this link for a document stating warning signs and issues relating to over production of hot water : <http://www.hetas.co.uk/hot-water-systems.doc>

It is far better to run a system with slightly LESS water capability than it is too much. After all - if you are producing an excess, exactly where does it go ? If you produce not quite enough, you can always boost the water level by using an immersion heater for a little while or by allowing a linked heating system to kick in slightly to top up the balance.

Using a small boiler HORIZONTAL PLATE type boiler, will easily provide 3kw / approx 10,000btu of heat output to either water or radiators. This is generally enough to supply 3 standard sized radiators or a standard sized hot water tank. A thermostat and small central heating pump should always be used when heating radiators as water can have a long run to travel.

It is always wise to fit an extra radiator though (eg, 4 instead of 3). If only running radiators, the heat will be spread further and the radiators may not get quite so hot, but

at least there is a lesser chance of overheating water if the stove is being run particularly hard.

When heating a hot water tank only, this can be gravity fed as long as the hot water tank is above the level of the stove. As the incoming water is heated, it then rises to the hot water tank. A thermostat should be fitted along with an “emergency” radiator - so if the tank gets too hot then the thermostat trips and sends the excess to the radiator.

A KILOWATT....

One kilowatt per hour (kw) of heat is approx the equivalent of a single convector radiator around 600mm high x 1000mm wide.

Stoves are all rated to the MAXIMUM achievable heat output. Therefore if a stove has a maximum heat output of 10kw as an example - it is capable of producing up to 10 standard sized radiators of heat to the room. Despite this, stoves are not generally intended to be burned at 100% maximum.

Infact, 70% of the maximum achievable should be saturation point. This is when the maximum amount of produced heat is being stored in the stove,(with very little wasted heat escaping from the chimney), gasses are being reignited and fuel being burned to optimum. If you go outside, and look at the top of the chimney, the gasses should be running clear and only a haze seen.

Burning at too high a rate is wasteful of fuel, given most of the extra heat is lost up the chimney and can put any stove at risk long term risk of stress or cracking. More than 10 > 20% below this point, deposits are not fully burned off and gather inside the chimney forming as tar. Looking at the chimney from outside, grey smoke can be seen.

Under general usage, if you buy a stove with an excessively high heat rating to the room space means you have to constantly run the stove very low. By doing this for frequent long periods of time, far less water is produced so this practice, more deposits are formed and chimneys and liners are at more risk or deterioration. It is therefore more practical to often have a smaller unit with a more comfortable output of heat to the living space and run it nearer to the top end 70% to get the most out of the boiler whilst topping up the heat to the system if required by other means (such as immersion heater, combi boiler).

In many cases where a 50 : 50 split or wrap around type boiler stove is being fitted, the heat output to the room will well exceed the desired water output. A way of increasing the water output to the rads if also heating hot water could be to fit a motorised valve or solenoid type switch. Therefore, once the hot water tank is heated and full - the water bypasses that and on to the rads. The system can be “boosted” by switching on an immersion heater if required. With a solenoid type switch you should be able to manually choose to divert the water from hot water tank to rads and back.