

## Problems with Baffles and seals

Version 1 February 2018

“Baffles”, turbulators, retarders or whatever name people choose to call them by are basically a set of steel plates that keep the heat inside the boiler for as long as possible and ensure the maximum amount of contact possible between the water jacket and the heat produced by combustion. If they weren't there the heat would leave the boiler very quickly through the flue system and it would be very inefficient.

There have always been occasions of baffle distortion over the years, but in normal circumstances a set of baffles would usually last the life time of a boiler. Baffle distortion was usually caused by lack of maintenance, flue problems or incorrect settings of combustion readings and occasionally by a manufacturer “over baffling” an appliance to make it as efficient as possible.

Over the last few years we have seen a massive increase in leakage of burner seals, baffle distortion and even holes being burnt through the centre of the baffles. If this happens, fuel consumption will increase as too much heat is leaving the boiler through the flue system, which in turn can cause damage to flue seals on balanced flue boilers

No one is sure what is causing this and therefore there is no definite answer or solution to the problem, but because there is also an increased problem with leaking burner seals it may point to over pressurisation of the combustion chamber. Some things that could cause this apart from a blockage in the flue system are:

1. Trying to put too much heat into the boiler. Fuel has changed considerably over the last decade or so and by keeping to a boiler manufacturers settings now, when the manufacturer designed the boiler 15-20 years ago could be having some effect. Manufacturers are not interested in trying to alter settings on appliances that are no longer in production.
2. Fuel additives. Some additives claim to make an appliance more efficient and some claim they make the flame hotter. Others absorb dirt and water from the oil tank and pass it through to the burner where it can be “burnt off”.
3. Fuel quality. The changing chemical composition of modern Kerosene means it has the ability to absorb more water than ever before; and as the fuel warms within the Storage tank in the summer months the absorption rate increases further.
4. Blended fuels. If kerosene has been blended with or contaminated by another grade of fuel, then the calorific value of the mixture could be higher than normal and could result in a hotter flame being produced.

If water is absorbed and passed through to the burner, regardless of how little moisture there is; due to the heat of the flame this water will then instantly boil and turn to steam. Steam has a much greater volume than normal flue gases and the increased volume of steam together with the normal products of combustion could increase the combustion chamber pressure as they are struggling to get out of the flue system quickly enough. This could have a similar effect to over baffling or a blocked chimney.

BS 2869 which governs the various parameters of kerosene and other fuels was altered in 2010, because of this it has allowed an overlap between Kerosene and Gas Oil. The Specific Gravity (Relative Density) of Kerosene was variable between 0.775 and 0.82 kg per cubic meter, it is now acceptable to be as high as 0.84 kg per cubic meter, but Gas Oil (Diesel) starts from 0.825 meaning that heavier grades of Kerosene can now include thinner grades of Gas Oil ! This in itself could lead to higher carbon formation and poor combustion in vaporising appliances, and increased temperatures of flames and appliance output, which could be the cause of baffle distortion and damage of burner seals in boilers. A lot of fuel that has been tested is towards the higher Specific Gravity range.

Over the next year or so during annual services or breakdowns, we may attempt to reduce the output of appliances to the minimum output specified by the manufacturer in a bid to reduce baffle distortion and damage to burner seals. As most properties have increased their insulation levels over the years by adding loft insulation, cavity wall insulation and double glazing along with more efficient heating controls such as room stats and Thermostatic Radiator valves; many boilers are now oversized for the property which makes them less efficient.

Down rating the appliance output could also make the boiler more efficient and reduce fuel consumption.