

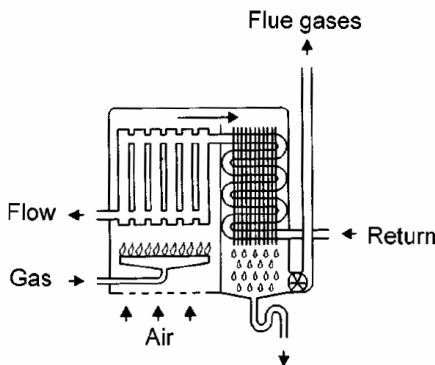
CONDENSING BOILERS – OPERATION, BENEFITS AND MYTHS

How Condensing Boilers Work

Condensing boilers are highly efficient boilers that have much lower fuel and running costs than conventional boilers.

Condensing boilers offer tangible benefits by:

- Reducing carbon dioxide emissions and helping to combat global warming.
- Improving household efficiency thus reducing fuel bills.



They work on the principle of recovering as much as possible of the waste heat which is normally rejected to the atmosphere from the flue of a conventional (non-condensing) boiler.

This is accomplished by using an extra-large heat exchanger or sometimes two heat exchangers within the boiler which maximises heat transfer from the burner as well as recovering useful heat which would normally be lost with the flue gases.

When in condensing mode (as condensing boilers do not condense all the time) the flue gases give up their 'latent heat' which is recovered by the heat exchanger within the boiler and used to preheat the return water, as illustrated in the diagram.

As a result the temperature of the gases leaving the flue of a condensing boiler is typically 50-60°C compared with 120-180°C in a current non-condensing boiler. At the same time an amount of water or 'condensate' is produced.

A condensing boiler will always have a better operating efficiency than a conventional non-condensing one, due to its larger and more efficient heat exchanger.

Addressing the Myths

The benefits of condensing boilers are therefore quite clear, and in order to encourage greater take-up of these benefits we now need to address the myths surrounding them.

Myth: They are only efficient when fully condensing.

Not true. Due to its larger heat exchanger, a condensing boiler does not have to condense in order to be more efficient. Typically a new gas condensing boiler will have a seasonal efficiency of between 84% and 92% compared with a new non-condensing boiler at 78% or an older boiler at 55-65%.

See table for typical annual fuel costs for condensing and non-condensing boilers.

Boiler Type		New non-condensing	New condensing
Seasonal Efficiency (SEDBUK)		78% (Band D)	90% (Band A)
Typical Annual Fuel Costs	Flat	£197	£175
	Bungalow	£249	£220
	Semi-detached	£289	£254
	Detached	£396	£347

Myth: They need larger radiators.

No change necessary. In most systems, radiators are already oversized for all but the severest weather. A marginal benefit of approximately 3% may be obtained from oversizing radiators for a new system, as this will allow slightly cooler return water to the boiler and maximise time spent in condensing mode, but this is usually uneconomic and impractical.

Myth: They are less reliable.

Not true. This was true with the early models of condensing boilers, but through improvements introduced as a result of this early experience, the components in modern condensing boilers are as reliable as those in the equivalent non-condensing models.

Myth: They are harder to maintain.

Not true. The only minor difference is the need to ensure that the condensate drain is clear when servicing.

Myth: They cannot be fitted to existing systems.

Not true. Condensing boilers are suitable for replacing most existing boilers. As with any replacement boiler, the effectiveness of the control system and type of hot water cylinder should be assessed when conducting a site survey.

Consideration should also be given to cleaning and flushing the system before fitting a new boiler.

Wall hung condensing boilers are readily available, with extended fluing options if required.

Myth: The plume is a nuisance.

Because the flue gases leaving a condensing boiler are cool, they tend to produce a noticeable mist or plume of water vapour around the flue terminal itself (as they condense upon contact with the atmosphere), especially under cold conditions. This is not a problem and in fact indicates that the boiler is working as intended. However, consideration should be given to boiler and flue location prior to installation so that the plume will not be too close to neighbouring properties or windows, doors and paths regularly used in the winter.

Myth: The condensate is a problem.

Not true. With modern systems, only about one litre per hour of condensate is produced, which has a pH in the range of 3.5 to 5 – about the same acidity as tomato juice. As previously discussed, this is carried to a normal drain by means of a simple plastic overflow pipe.

