Unit 208: Central heating systems

Outcome 1 (part 3)

Types of domestic central heating systems installed in domestic dwellings

Boilers

Boiler types

- Back boiler
- System boiler
- Independent boiler
- Combination boiler
- Electric boiler
- Condensing
- Floor standing
- Wall mounted

Boilers

Boilers

These are covered by Building Regulations part J – heat producing appliances.

Only Competent Persons within their areas can install these appliances:

- Gas safe
- 17th Edition IET
- OFTEC
- HETAS

Boilers

Legal requirement

No matter which type or style of boiler is installed, the engineer **must** be a registered Competent Person.

Online resources:

Gas:	www.gassaferegister.co.uk
Oil:	www.oftec.org
Solid fuel:	www.hetas.co.uk
Electric:	www.niceic.com

Boilers

Boilers

Central heating systems today are generally heated by one of four fuels:

- Gas (natural and LPG)
- Oil
- Solid fuel
- Electricity

Natural gas and electricity are supplied to the property via the national grid, whereas LPG, oil and solid fuels have to be delivered.

Boilers

Gas boilers

These are by far the most popular type of boiler and they can burn either LPG (propane) or natural gas (methane based gas).

Traditional (non-condensing) boilers
or
Condensing boilers

Under Building Regulations part L, in the vast majority of cases, only SEDBUK rated A condensing boilers can now be fitted.

Boilers

Gas boilers

Traditional boilers use one heat exchanger to heat up the primary water and are less efficient, allowing the latent heat to be expelled to atmosphere.

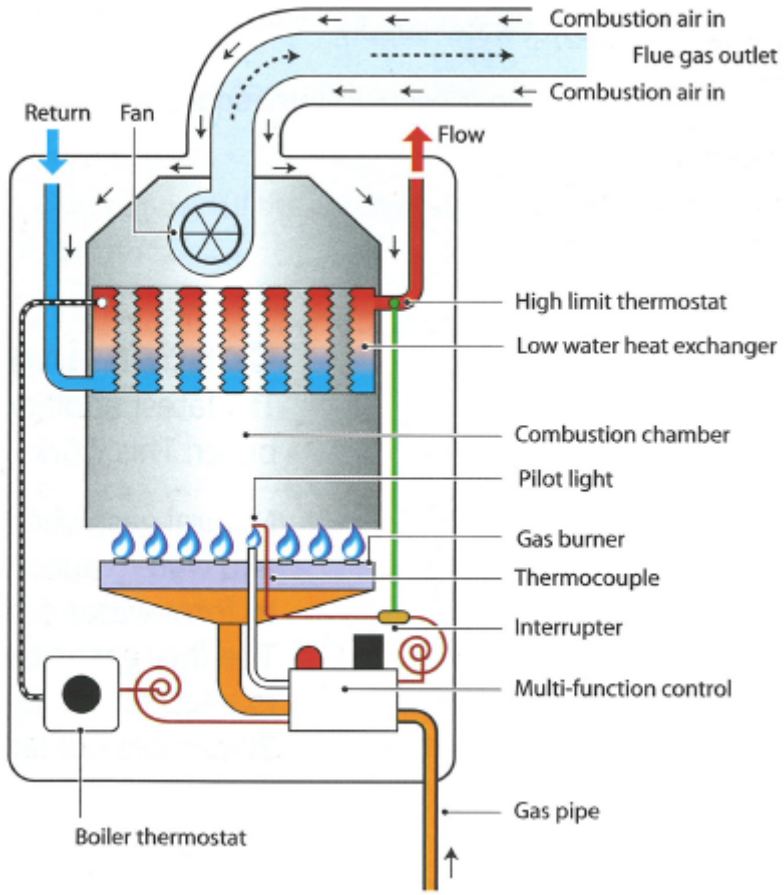
Condensing boilers use two heat exchangers to heat up the latent heat within the system. This makes them far more efficient, which is why Building Regulations part L requires them to be fitted.

Boilers

Gas boilers

Traditional (non-condensing) boilers

Use a single heat exchanger to heat up the primary water, allowing the flue gases and latent heat to be emitted to atmosphere.

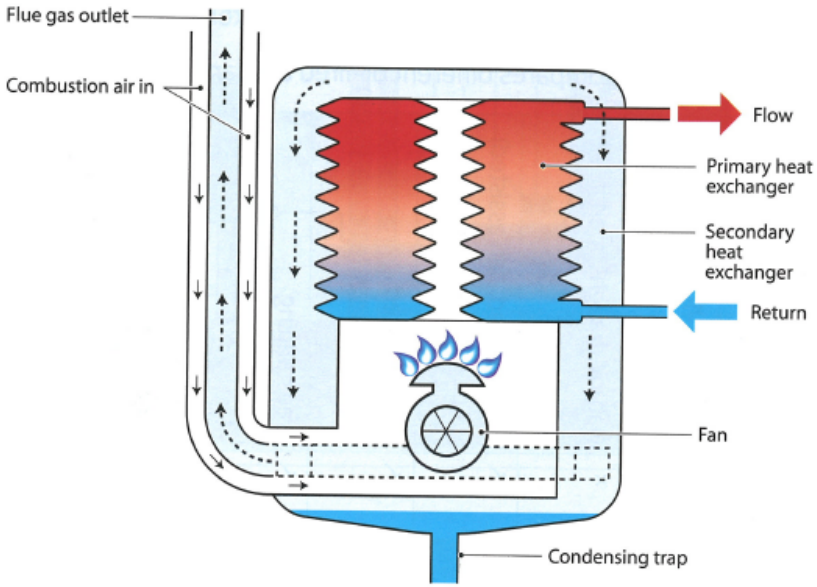


Boilers

Gas boilers

Condensing boilers

The increase in efficiency is achieved by the flue gases passing over a second heat exchanger, allowing the gases to cool to 55^0C and condensate the latent heat that is given off. Because of this condensation, pluming occurs from the flue and provision has to be made to drain the slightly acidic condensate from the boiler.



Boilers

Gas boilers

Condensing boilers

Advantages:

- Compliant with Building Regulations part ‘L’
- High efficiency
- Reduction in system corrosion
- Quiet in operation
- Condensing combination boilers offer good flow rates

Disadvantages:

- Higher maintenance
- Disposal of acid condensate
- Use more gas if not in condensate mode

Online resource:
http://www.worcester-bosch.co.uk/installer/boilers/what-is-a-condensing-boiler

Boilers

Gas boilers

These traditional and condensing boilers are available in three main designs:

1. Conventional boiler
2. System boiler
3. Combination boiler

Boilers

The SEDBUK rating

Seasonal Efficiency of Domestic Boilers in the UK outlines the efficiency rating of boilers.

Generally only SEDBUK rated A boilers can be installed.

Band	SEDBUK range
A	90% and above
B	86% - 90%
C	82% - 86%
D	78% - 82%
E	74% - 78%
F	70% - 74%
G	below 70%

Boilers

Gas boiler designs

Conventional boiler

Economical boilers for central heating systems. These are a standalone basic boiler for which you need to purchase all the system components, including the circulator, automatic bypass and expansion vessel, if required.

If an open vented system is installed, a conventional boiler is required.

Online resource:
http://www.worcester-bosch.co.uk/installer/boilers/what-is-a-regular-boiler

Boilers

Gas boiler designs

System boiler

These are more commonly installed nowadays and include the circulator, automatic bypass and an expansion vessel. This saves time and space on the installation.

If a sealed system is required, a system boiler is the preferred choice.

Online resource:
http://www.worcester-bosch.co.uk/installer/boilers/what-is-a-system-boiler

Boilers

Gas boiler designs

Combination boiler

Popular for small to medium properties, with instant hot water under mains pressure, with a sealed central heating system. Cold mains water passes through a plate heat exchanger in the boiler and onto the tap. This replaces the need for a DHW cylinder, CWSC and F&E.

Before installation the incoming pressure and flow rates at the property need to be checked.

Online resource:
http://www.worcester-bosch.co.uk/installer/boilers/what-is-a-combi-boiler

Boilers

Gas boilers

Combination boiler

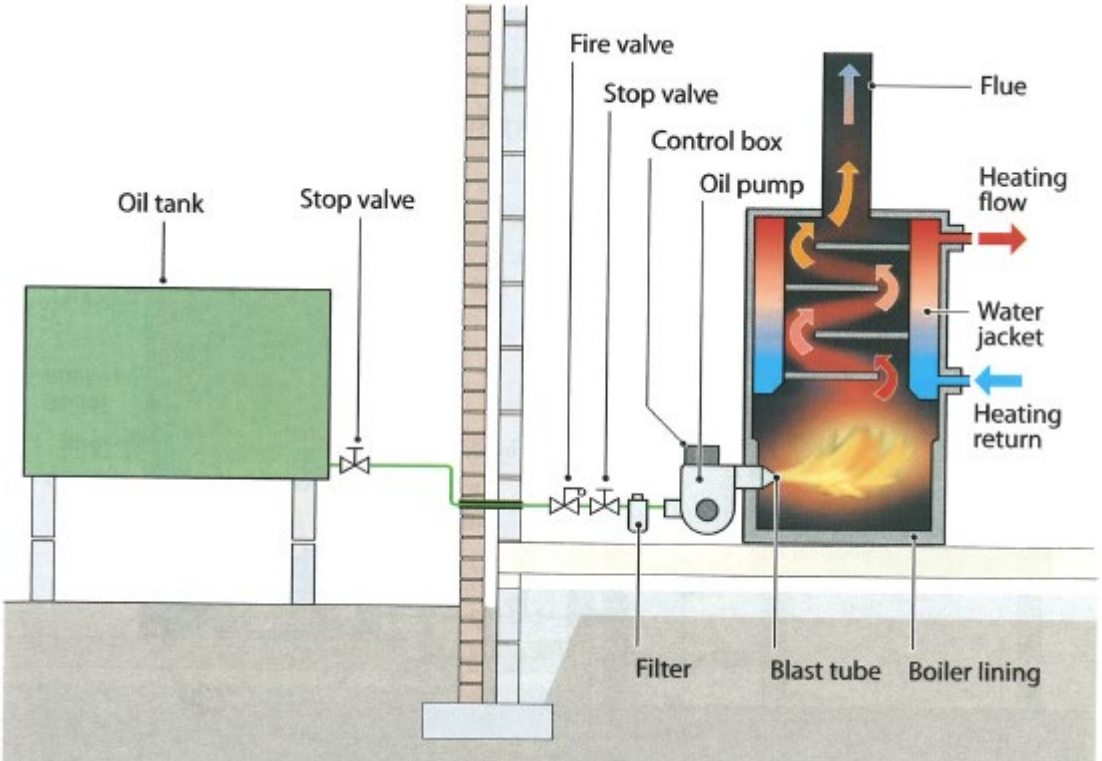
The limitations of a combination boiler should be outlined to the customer before installation.

- Only supply DHW to one draw-off point at any one time
- Take time for DHW to reach temperature
- When DHW is demanded the CH circuit is cut off
- Flow rates are set by the manufacturer to gain required temperature rise
- Scaling can occur in hard water areas
- No DHW back-up if mains is cut

Boilers

Oil boilers

These tend to be installed in more rural areas and are also available in conventional, system and combination boilers. To be compliant with Building Regulations part L, a condensing oil boiler will now need to be installed.



Boilers

Fuel sources:

- Natural gas
- LPG
- Solid fuel
- Bio fuels
- Oil
- Electric

Symbols

Being able to read a drawing correctly is important for any installation. Whether it is a drawing from an architect or a drawing in the manufacturer's instructions, the correct components are required.

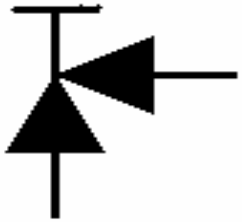
The following symbols from BS 1192 are some of the common components from a central heating system.

Symbols

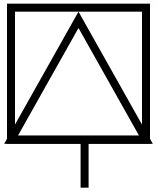
Symbols BS 1192: part 3, 1987

Drain off Valve

Double Check Valve



Radiator Valve



Automatic Air Vent (A.A.V)

Circulator or pump