

Keeping people safe

Health and safety toolkit

Biomass boilers



This guidance highlights some of the risks associated with Biomass Boiler Systems and steps that should be considered to help manage these risks.

As renewable energy technology develops, Biomass is increasingly viewed as a green alternative to traditional forms of energy.

Biomass can be used directly to generate power, produce heat or used in combined heat and power plants. In simple terms a Biomass boiler burns non-fossil fuels such as wood fuel (pellets, chips, logs and forestry material) to produce energy to heat water that is then distributed via a low pressure water system around the building.

When considering the installation of this form of boiler, special attention is required at the design, installation and usage stages to help minimise any fire risk or the risk of injury associated with this energy source.

There are a number of potential fire hazards associated with biomass boiler systems, which include the equipment and the materials used as the fuel, with potential risks to people, property and business. However, if the system is installed correctly and maintained as recommended by the manufacturer, its safety performance should be no different to a traditional gas or oil-fired boiler.

What you need to do

By adopting a sensible approach much can be done to ensure a biomass boiler works safely and efficiently to provide heat and hot water to your premises.

It is important to employ an expert to undertake a feasibility study. You should inform us that you are planning to install a biomass boiler at the earliest opportunity.

Our minimum expectation for any commercial based system is set out below.

The installation

- The proposed system should be designed, installed and commissioned as per the relevant standard e.g. Microgeneration Certification Scheme (MCS) standard. See <https://mcscertified.com/>.
- The Installer should be a member of a third party accreditation scheme, e.g. HETAS, that provides competent person verification. See <https://mcscertified.com/find-an-installer/> and www.hetas.co.uk/find-installer. Alternatively, the appointed engineer must hold a valid training certificate or qualification for installation and servicing of the boiler from the boiler manufacturer and associated equipment.
- You should ensure any apparatus is not sited where there is a possibility of damage by flood, e.g. a basement area.

Maintenance

- All plant and equipment must be inspected, serviced and maintained at least annually as per the manufacturer's recommendations. All work must be undertaken by an approved and qualified engineer, e.g. HETAS or MCS approved installers.
- Alternatively, the appointed engineer must hold a valid training certificate or qualification for installation and servicing of the boiler from the boiler manufacturer and associated equipment.
- Areas associated with the biomass boiler equipment, including fuel storage areas and boiler house, need to be swept out and cleaned down at least weekly and all combustible waste removed.

- All surfaces where dust and debris can accumulate, including light fittings, service trunking and roof joists must be cleaned down at least every 6 months.
- The combustion grate ash should be emptied (whether via an automated closed ash hopper or not) in accordance with the manufacturer's instructions. Any ash needs to be deposited in a lidded metal bin designated for disposal of ash only. Contents of this bin are to be damped down and then removed to an external location at least 10 metres from any building.
- Fuel stores must be thoroughly vacuum cleaned or swept out at least every 5 deliveries or annually, whichever the sooner.

Reducing the fire risk

- If possible, the boiler should be located in a self-contained external building of non-combustible construction.
- The boiler should be fitted with a fuel feed safety device to prevent fire on the combustion grate burning back up the feed mechanism in the event of fuel delivery failure or incorrect set up of fuel ratios.
- Flues to the system must be maintained in accordance with the manufacturer's recommendations and be subject to regular cleaning to prevent accumulation of soot or tar if wood burning. See www.nacs.org.uk/sweep-search, apics.org.uk/find-a-sweep, www.guildofmasterchimneysweeps.co.uk or www.sweepsafe.com.
- The boiler house and storage unit should be protected by an automatic fire detection system designed and installed to BS 5839-1, preferably with remote signalling to an alarm receiving centre certified to either BS 5979 Cat II or BS 8591 Cat I.
- As a minimum, a 9kg dry powder fire extinguisher must be sited in the boiler house and fuel storage unit.
- The bulk storage of fuel should, if possible, be in a separate unit from the boiler house and we would recommend a minimum distance of 10 metres away. Where this is not possible, the boiler house and fuel storage unit should be separated internally by materials that provide fire resistance for a minimum of 60 minutes.
- For fuel deliveries, consideration needs to be given to reduce the risk of impact damage from vehicles of fuel suppliers.
- A damp proof membrane should be installed to the fuel storage area, particularly if this is subterranean to reduce the risk of fuel getting damp and spontaneous combustion occurring.
- You must only use the type of fuel recommended by the manufacturer.
- When using wood chips, there is a potential risk of spontaneous ignition causing a fire if microbial activity occurs. The chips need to be turned regularly to reduce the risk of this occurring.
- Wood pellets can produce dust during delivery, transport and storage periods that can enhance the explosion risk. Dust build up must be kept to a minimum and you must ensure that any ignition source (e.g. smoking, fires or naked flames) are not used near the storage areas. Using good quality pellets with a low dust content and good mechanical durability is important. Ensure zones are created to contain dust within the fuel store so that it cannot escape between the fuel store and boiler room. In some situations, an explosion relief panel may be appropriate.
- For larger installations it is recommended you consult with your local fire and rescue service so they can plan how to extinguish a fire if one occurs.

Reducing the risk of injury

- Given the explosive nature of wood dust there may be a requirement to meet the legislative requirements of Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) where biomass heating is being used in a workplace.
- There will also be a requirement to meet the legislative requirements of the Regulatory Reform (Fire Safety) Order 2005 where systems are being used in a workplace. Fire and general risk assessments completed for a workplace must include the hazards related to this equipment and precautions to ensure people are protected.
- Relevant training (including refresher training) must be provided to staff and any volunteers operating in a workplace about the hazards and precautions required when using this equipment. It is important employers keep records of this training for future reference.
- The UK Health and Safety Executive have identified the danger of potential carbon monoxide poisoning with the storage of wood pellets, which is the most common form of fuel for these heating systems. The following actions should be followed to reduce the risk of injury or death:
 - Your safety risk assessment should consider the dangers and controls of carbon monoxide.
 - Warning signs should be placed on both sides of the pellet storage access door so it can be seen when the door is open advising "DANGER -RISK OF CARBON MONOXIDE POISONING. You should check the atmosphere before entry with an appropriate device. Entry should be restricted to authorised persons only.
 - No one should enter the wood pellet storage area or place their head into a wood pellet hopper unless authorised to do so and following an agreed safe system of work.
 - The room should be adequately ventilated before entering. The door must be kept open whilst inside.
 - Adequate ventilation should be provided in the storage area.
 - Ensure that the boiler and pellet feed mechanism is cleaned and serviced by a competent person as specified in the manufacturer's instructions.
 - If any problems are encountered with the boiler and pellet feed mechanism, e.g. the system is not heating correctly or flue gas is flowing into the boiler room, turn off the system and contact the supplier and/or manufacturer and request assistance.
 - Filling procedures should be carried out in accordance with the instructions of the heating installation company and pellet suppliers.
- RC64: Recommendations for fire safety with small biomass installations. RISC Authority. https://www.riscauthority.co.uk/free-document-library/RISCAuthority-Library_detail.rc64-recommendations-for-fire-safety-with-smallbiomass-installations.html.

Helpful information

- Health and Safety in biomass systems: Design and operations guide. Combustion Engineering Association. www.cea.org.uk
- Biomass heating: A practical guide for potential uses. Carbon Trust. www.carbontrust.com
- Biomass heating: A guide to feasibility studies. Forestry Commission. www.forestry.gov.uk/Guide-Feasibility-Studies
- Safe storage of wood pellet and wood chip fuel. RR1077 Research Report. Health and Safety Executive www.hse.gov.uk/research/rrpdf/rr1077.pdf
- RC64: Recommendations for fire safety with small biomass installations. RISC Authority. www.riscauthority.co.uk/freedocument-library/RISCAuthority-Library_detail.rc64-recommendations-for-fire-safety-with-small-biomass-installations.html.



Want to know more?

We have produced some other useful resources to help you get started or simply check the adequacy of what you have already done. These are all available at:

www.methodistinsurance.co.uk/healthandsafety

Note: if you are in Ireland, Northern Ireland, Jersey, Guernsey or the Isle of Man then regional variations might apply. In this instance, you should check the guidance provided by the enforcing authority for your region. This will be freely available on their website.

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Need to contact us?

For further information on health and safety in churches:

Call our Risk Management Advice Line on

0345 600 7531

Monday to Friday, 9am to 5pm (excluding Bank Holidays).

We may monitor or record calls to improve our service.

Email us at: risk.advice@micmail.com



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