



Exclusively for HETAS Registrants

# HETAS TECHNICAL BULLETIN #15 SEPT 2019

Welcome to HETAS Technical Bulletin #15 which builds on the issues around particulate emissions from domestic solid fuel burning and how to ensure that our industry is part of the solution not part of the problem. There have been reports that suggest domestic burning is responsible for much of the particulate emissions in our environment. HETAS and SIA have joined together to work with a team of scientists who have studied the available data including modern measurement techniques and methods of understanding more accurately where the particulates come from. When the report is finalised we hope to be able to better understand emissions and to prioritise our efforts.

HETAS and Woodsure have worked closely with stakeholders and Defra to understand what might be done to educate people who burn solid fuel, wood and biomass in their homes on how to minimise emissions. The most trusted and appropriate people to help educate consumers are the trade professionals who install, service and sweep chimneys, as well as those who give advice such as retailers. We hope that this bulletin helps readers to see what can be done to support consumer education and protect the reputation of our sector: how to use fuel more efficiently and effectively. After much research and consultation we have put together this bulletin which should help installers, chimney sweeps, servicing businesses, retailers and others in our sector to understand the issues.

If you have comments we would be pleased to hear from you at: [hello@hetas.co.uk](mailto:hello@hetas.co.uk).

- Bruce Allen, CEO



# Choosing the Right Appliance

The economic, health and environmental benefits of purchasing a more efficient appliance . . . . . **PAGE 2**

## Appliance Lighting

Tips on how to safely and cleanly light a fire in a wood burning appliance . . . . . **PAGE 5**

### A Guarantee Of Quality Wood Fuel

How the Woodsure & Ready to Burn  
schemes have helped **PAGE 9**

### Wood Burning Roomheaters

Refuelling and general  
operating principles **PAGE 11**

### Servicing, Maintenance & Sweeping

And their importance to maintain  
a safe, efficient system. **PAGE 14**

# CONTENTS

# Choosing the Right Appliance



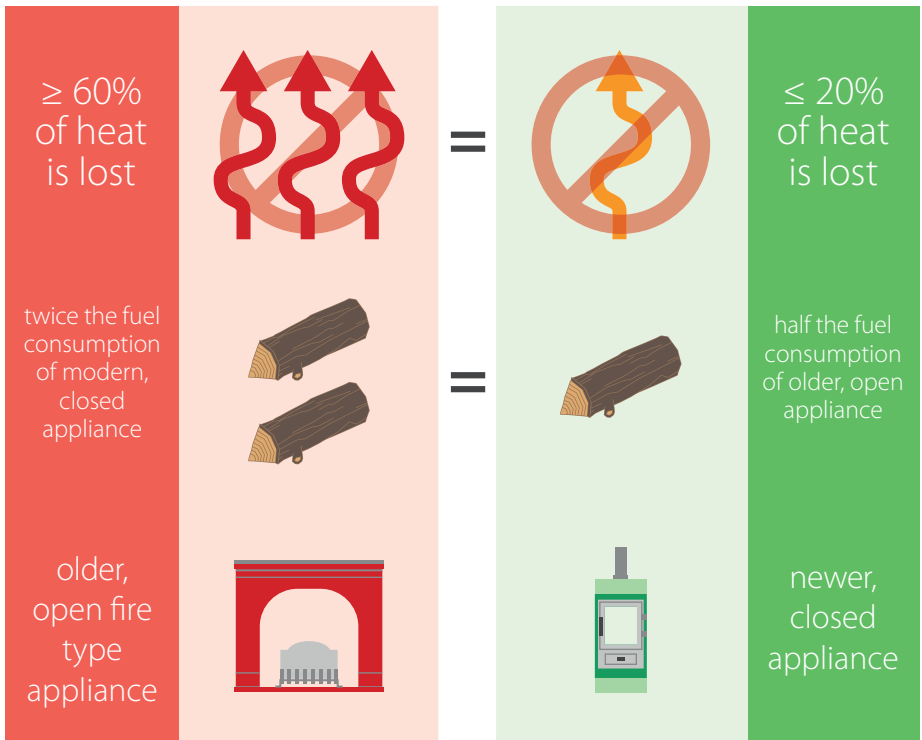
CALVIN MAY, TECHNICAL STANDARDS MANAGER TALKS ABOUT THE ENVIRONMENTAL IMPORTANCE, ECONOMIC BENEFIT AND INCREASED FUEL EFFICIENCY OF MODERN APPLIANCES OVER OPEN FIRES.

With the government's drive in reducing the impact on the UK environment from all attributed sources of known particulate emissions, did you know that something as simple as selection of the right type of heating appliance can play a significant part of not only improving fuel efficiency but also decreasing emissions when in use?

Until the early part of the 21st century, open fired appliances fuelled by mineral fuels were a common means of providing secondary heating to a property. The appeal of a real open fire on a hearth beneath a brick chimney providing a cosy and attractive source of heat meant they remained a popular option for many people.

Although open fires are still available on the market today, the need for greater efficiency in fuel usage has driven innovation which has played a key role in the development of solid fuel burning appliances. This has driven consumer choice away from open fires in favour of closed stoves. This transition has allowed modern appliances to keep the overall desired visual attractiveness of fuel burning, whilst at the same time improving fuel efficiency: reducing consumption as well as emissions. Not only does this save on heating costs in the long term, but also allows for cleaner combustion, helping closed appliances become part of the solution in improving the UK's air quality.

For example, older open fire type appliances have an efficiency of around 40%, whereas newer, closed appliances can have efficiencies of 80% or more in some cases. In simple terms this means that only 20% of the heat produced from the burning fuel is lost through the chimney system, the rest of which is utilised to heat the room in which the appliance is installed. In comparison open fires may lose 60% or more of the heat produced from the fuel up the chimney. This means less heat for the room and higher running costs for the user.



*Older open fire type appliances compared to modern, closed appliances.*



Whether purchasing or advising on the purchase of a solid fuel burning appliance, remember the following considerations detailed below to promote the “Cleaner” selection, operation and maintenance of any solid fuel burning appliance:

**C** **LOSED ROOMHEATER APPLIANCES** increase the overall efficiency of the installation, and have a greater impact in reducing the emissions during the solid fuel combustion process. This not only helps the environment but also reduces the operating costs for the appliance

**L** **IGHTING, CONTROL AND DE-ASHING** of the appliance should always be carried out in accordance with the manufacturers prescribed operating instructions, paying special attention to the set up and adjustment of all designated air controls so as to not overfire or slumber the appliance

**E** **XEMPT AND ECODESIGN COMPLIANT** appliances incorporate advanced technology and have been independently verified in meeting more stringent emissions and efficiency performance levels, reducing the number of particulates released into the atmosphere from solid fuel appliance burning

**A** **LWAYS USE THE CORRECT AND INTENDED FUELS** for the appliance, preferably fuels that have been independently certified to verify their quality, and ensuring any wood burnt is 20% moisture content or less

**N** **EVER BURN UNAUTHORISED FUELS** (such as wood) on an open fire that is not designed to do so, as this will not only cause chimney blockage but lead to an increase in emissions. Recent research confirms that a new, efficient Ecodesign stove produces around 80% less emissions than an old open fireplace

**E** **NSURE THE APPLIANCE IS APPROPRIATELY MAINTAINED** and serviced annually, and that the chimney is swept by a HETAS Approved Chimney Sweep in accordance with the scheduling instructions detailed in the appliance manufacturer's servicing instructions

**R** **EFUEL THE APPLIANCE ON A LOW BED OF EMBERS**, as if there is insufficient burning material in the appliance, excessive smoke can occur. Refuelling should be carried out on sufficient glowing embers and ash under conditions that the new fuel will ignite in a reasonable period

Following these simple, yet effective measures, the industry can play its part in supporting the improvement of UK air quality rather than being part of the problem. So ensure consumers are aware of their responsibilities in supporting the push for cleaner air by burning good quality fuel on an efficient appliance that is installed, serviced and operated correctly and producing overall **C-L-E-A-N-E-R** burning.

# Appliance Lighting

OLIVER EDGAR, TECHNICAL HELPLINE ADVISOR  
WITH TIPS ON HOW TO SAFELY AND CLEANLY LIGHT  
A FIRE IN A WOOD BURNING APPLIANCE



Under article 20 of the CAA (Clean Air Act), it is an offence to emit dark smoke from any chimney serving a solid fuel heating appliance, and the occupier of the building may become liable if found to be in breach of these conditions. In avoiding these types of scenarios, any dark smoke emitted may indicate incorrect operation for the installed appliance. Common reasons for this may be inappropriate fuel, misuse or lack of knowledge from your customer.

Different manufacturers have varying lighting techniques to aid ease of use and reduce smoke emissions for the particular design of the appliance. The manufacturer's operating instructions should always be left with the consumer and be referenced and understood before operation.

Installers can further educate the consumer during the commissioning phase by showing the correct techniques on lighting and refuel of the appliance following the manufacturers prescribed guidance.

In the absence of manufacturer guidance on appliance lighting, here are two different methods of lighting appliances:

**For both methods, you will need a firelighter or newspaper and some kindling.**

## TRADITIONAL METHOD

With the use of a firelighter and a small amount of kindling, a small amount of heat will be produced to warm the flue. Firelighters can be an easier method as they burn at a steady rate unlike newspaper which can differ dependent on its state when burned.

When using paper that is too lax, the paper will burn too fast and may not ignite the kindling; this will mean restarting the lighting process. Paper that is too compact will not combust properly and smoulder causing excessive smoke: where the flue is not up to temperature this may emit from the apertures of the appliance.

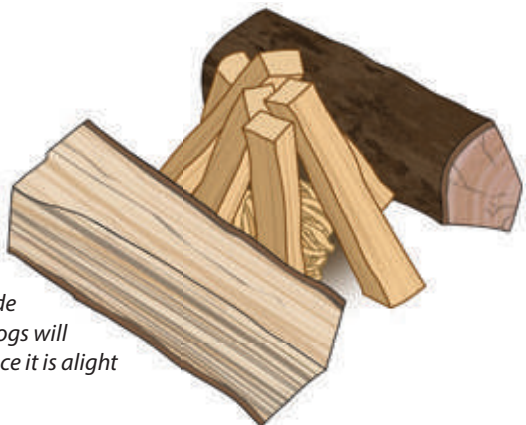
1. Use two tabloid size pieces of newspaper crumpled into a loose ball about the size of a cricket ball or firelighters and place in the combustion chamber.
2. Place small pieces of dried kindling into a triangular shape over the newspaper, allowing for air gaps. On larger appliances place two smallish logs either side of the kindling to allow for larger logs to be placed over the well alight kindling.
3. Ensure that the air controls are set to the manufacturer's guidelines to make lighting as easy as possible.



*Above: "Wood Wool" is an increasingly popular type of firelighter*



*Left: The traditional fire lighting method involves making a triangular "teepee" of dried wood kindling over the crumpled newspaper or firelighters*



*Right: Larger appliances may need two smallish logs placed either side of the kindling teepee so larger logs will be able to be stacked on top once it is alight*

## UPSIDE DOWN METHOD (a.k.a Top Down method)

The “Traditional” method has been used since the dawn of wood burners but due to technologies advancing the little black box has evolved. With appliances now being more efficient, with convoluted baffles, not as much heat is lost up the chimney and more radiated into the room. The below method aids in the flue getting up to temperature more quickly and removes the need to open the appliance door to add fuel to the kindling which means there is less of a chance of the combustion chamber cooling. Once the well ignited kindling has burnt though, the flue shall be warm and the logs which the kindling have sat upon should now be charred and ignite cleanly.

1. Place two small logs across the fire bed.
2. Place 5 pieces of kindling across the two logs, then 4 pieces laid at a 90 degree angle across the bottom layer and place two firelighters in between the gaps.
3. Add another five pieces of kindling laid in the same direction as the bottom layer.
4. Set the controls of the appliance to the lighting position.
5. Light the firelighters and close the door of the appliance. The fire will slowly increase, warming the flue gradually without producing copious amounts of smoke and pollutants to the atmosphere.
6. Set the air controls to manufacturer’s settings.
7. Leave the kindling well alone until the top of the appliance feels warm, and then close the primary air control. The kindling will fall between the logs. Once these are burning well the burn rate of the appliance can be adjusted and more logs applied to the fire as required.



*Left: The kindling for the “Upside Down Method” must be arranged in a criss-cross stack, a little like a log cabin, ensuring plenty of air can pass through to the firelighter(s) in the centre.*



*Below: The “Upside Down Method” ready for lighting - the kindling is placed above the logs in this method*





*Left & below: White Horse Energy provide a Woodsure Ready to Burn approved firelighting kit*



## BIOMASS BOILERS:

Pellet burners have an automatic ignition system where a certain amount of either chip or pellet fuel will be dropped into a crucible and an element heated which will slowly ignite the fuel. Due to the nature of this technology, apart from an occasional push of a button little user interaction is needed as start-up can normally be automatic when set to the desired temperature.

Most log biomass boilers will have charcoal left over from the previous burn cycle in the combustion chamber. A quick rake of the charcoal into the middle and following the traditional method of lighting with the recommended amount of fuel should suffice to bring the appliance back into life.

Referencing the lighting procedures detailed above, once the fire is established, a flue draught test reading should be taken to ensure that the readings are within the appliance manufacturer's draught range and recorded on the commissioning record. A flue draught reading under the prescribed range will make the fire sluggish and difficult to light, a reading higher than the scale will create excess draw, resulting in a flame that is uncontrollable and fuel wastage.

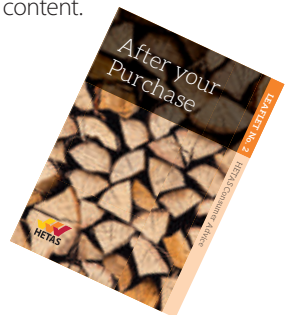
To aid in the reduction of smoke, the fuel selected should be cut to the right length for the appliance, split to the correct size, and be the correct moisture content.

For more information on fuel visit: [www.woodsurre.co.uk](http://www.woodsurre.co.uk)

Further information for consumers on how to use and take care of their appliance can be found in the HETAS Advice sheet "After Your Purchase". View it at:

[www.hetas.co.uk/consumer/hetas-advice](http://www.hetas.co.uk/consumer/hetas-advice)

or purchase from the HETAS shop [www.shop.hetas.co.uk](http://www.shop.hetas.co.uk)





# Wood Fuel Quality



ANDREW HOPTON,  
DIRECTOR OF  
WOODSURE  
AND HETAS  
ON THE INPUT  
THESE TWO  
COMPANIES  
HAVE HAD ON  
THE INDUSTRY



Air quality continues to be of significant importance to the solid fuel and biomass industry, whose agreed aims look to improve the quality, efficiency and safety of appliances, fuels, associated equipment and installation & maintenance services.

Both HETAS and Woodsure have been working closely with DEFRA (Department for Environment, Food and Rural Affairs) over recent months, in support of the governments clean air strategy to reduce overall emissions and significantly improve air quality through promoting the benefits of burning clean, dry, quality wood fuel.

HETAS and Woodsure set to meet these continued objectives and implement awareness measures improving air quality through its extended support of industry activity, discussion and promotion at both government and stakeholder level, which in turn inputs directly into the wider development of legislation, standards and supporting initiatives for the UK. Both HETAS and Woodsure attend a wide number of industry technical groups, and have inputted to a number of consultations affecting air quality issues, and ensuring the industry is seen as part of the solution, and not part of the problem as some press releases claim.

These initiatives and projects include the release of the government recognised Woodsure Ready to Burn scheme (R2B), aiming to raise consumer awareness and promote the use of quality approved fuels with a certified moisture content of below 20%. All Woodsure R2B fuels will be appropriately checked for quality and moisture content and when eligible, will be able to display and affix the Woodsure R2B certification mark on product packaging, to allow consumers to make more informed choices about the fuel they burn, knowing it meets set standards and goes a way to significantly improving air quality during solid fuel burning. There are already a significant number of fuel suppliers on the register since its launch and the scheme is gathering great support and awareness.

*Right: A 1kg freshly cut log may contain around 600ml of water - roughly a pint of water.*



The Woodsure R2B scheme offers a simple message backed by scientific research that proves burning wood fuel between 12% and 20% will produce significantly less emissions than trying to burn wet wood.

A living tree or one that has recently been felled can contain over 60% moisture dependant on the tree species. If that tree is then processed for fire wood and sold on to a customer, it may look perfectly good to place straight on to the fire, but a 1kg log, freshly cut, will contain around 600ml of water, which is equivalent to one pint of water.

**Further information on the Woodsure R2B scheme, and to find your local Woodsure certified fuel supplier, visit the Woodsure website at [www.woodsure.co.uk](http://www.woodsure.co.uk)**

# Wood Burning Roomheaters




REFUELLING AND  
GENERAL OPERATING  
PRINCIPLES TO MINIMIZE  
THE EMISSION OF  
PARTICULATE MATTER  
(SMOKE)

– BRIAN BAILEY

Modern wood burning roomheaters can operate with very low smoke emission if good quality fuel is used and they are operated correctly in accordance with the appliance manufacturers' instructions.

This article is a reminder to installers that the way your customer operates an appliance can enable them to have minimal impact on air quality if done correctly, and provides simplified guidance to relay to the end user during the commissioning phase.

A black wood-burning stove is shown in a room. The stove has a large glass window on the front, through which a bright, active fire is visible. The stove is mounted on a grey stone or concrete wall. Above the stove, there is a decorative border with a speckled, pebbled pattern. A text box is overlaid on the right side of the image.

*Choose a HETAS Approved  
and Ecodesign appliance.  
Image courtesy of Charnwood.*

## REFUELLING ON TO A LOW FIRE BED

Allowing the fuel bed to die down to a very low level before adding more fuel can be detrimental to smoke emission. The new log can smoulder for a while before finally catching alight and during this smouldering time excess smoke emission can occur. Refuelling must be carried out onto a sufficient quantity of glowing embers to ensure the new fuel charge ignites quickly. If the bed of embers have inadvertently been allowed to die down and you suspect there may be an issue, it is beneficial to firstly add some good dry kindling across the embers before adding any whole logs. The kindling will ignite quickly which in turn will aid ignition of the log(s) preventing the smouldering time that can cause excessive smoke.

Once refuelled, always follow the appliance manufacturer's instructions regarding the setting of air controls and/or dampers so the optimum amount of air is supplied for the ignition of the new fuel charge and the possibility of smoke emission is mitigated.

## FUEL OVERLOADING

Modern appliances are designed to operate on a certain level of fuel load, which will be detailed in the appliance manufacturer's operating instructions. As a general rule the appliance should never be operated with more than the recommended maximum number of logs given for refuelling. Overloading the firebox with additional fuel will almost certainly be detrimental to smoke emission as the additional logs will not only take longer to fully ignite, they may also interfere with the circulation of combustion air that has been designed into the appliance to optimize combustion. There is also a danger that the extra fuel may cause over-heating and consequent damage to the appliance. This may go unnoticed by the user and the damaged appliance may then operate with excess smoke emission and could also void any warranties set by the manufacturer.

## OPERATION WITH DOOR(S) LEFT OPEN

Modern closed wood burning roomheaters are invariably designed to be operated with their doors closed. Their safe performance and correct operation, including the designed circulation of combustion air to minimize smoke emission, is therefore dependent upon the doors being closed during use. Continuous operation with the door(s) open can lead to excess smoke emission. Appliances must not be operated with the door(s) left open unless they have been specifically designed to operate in this way and the appliance manufacturer's instructions give guidance on how this can be achieved safely and without compromising safety or smoke emissions.





*A HETAS Approved and DEFRA exempt appliance can help reduce particle emissions.  
Image courtesy of Chesneys.*

## DAMPERS AND/ OR AIR CONTROLS LEFT OPEN

Most appliance manufacturers will provide guidance on how to set the air controls or internal dampers (if fitted) to enable mitigation of any smoke emission. Commonly the guidance will say to open air controls fully immediately after refuelling to allow the new fuel charge to ignite quickly, but once this has been established, air controls can and should be set to a lower more controlled setting to provide the desired heat output. Operation with the air controls or appliance dampers fully open all the time can cause overheating of the appliance and subsequent excess smoke.

## OPERATING AT LOWER HEAT OUTPUTS

In conjunction with the previous paragraph entitled “Fuel Overloading”, it is often desirable to operate an appliance at an output lower than its designed “Rated Heat Output”. This is often needed at the beginning and also towards the end of the heating season when the ambient temperature is warmer than in the depths of winter. With many wood burning appliances that have been exempted for burning wood in Smoke Control Areas, their design means it is not possible to completely close their air controls because they would emit excessive smoke under these conditions. As a result, the range of heat outputs or rather the amount they can be turned down by virtue of their controls can be limited. In order to achieve a lower heating demand as well as maintaining good low smoke emission, it is possible to simply add a lighter fuel load each time. Appliances will generally operate just as “smokelessly” as with a normal load when using this lighter loading of fuel approach.

# Importance of Servicing, Maintenance & Sweeping

A sound and functioning chimney is essential to the continuing safe and efficient operation of all solid fuel burning heating and cooking appliances. Any chimney system connected to an appliance should always remain clear of any obstructions, including soot deposits, birds' nests and other materials that may hinder the discharge of products of combustion to the outside atmosphere.

Properly functioning chimneys not only minimize the risks associated with chimney fires and spillage, but also play an important part in providing a good flue draught, meaning optimal performance of the appliance and subsequent reduction in overall emissions produced.

Over time there will be an inevitable build-up of soot and other deposits. If not swept regularly, eventually the build-up of deposits will interfere with the correct functioning of the chimney and this will cause the combustion process of the appliance to go wrong. This in itself will cause increased emissions and like a vicious circle the poor combustion will also increase the rate of deposition of soot within the chimney until it is so compromised that it poses a real risk of spillage of combustion products into the room. This is why it is so important that the entire flue-system is swept at regular intervals to remove sooty deposits and ensure a clear pathway for products of combustion to escape into the outside atmosphere.

Ensuring the appliance is appropriately maintained and serviced is also key to prolonging the life of the appliance and associated chimney system, reducing costs and ensuring efficient and clean burning takes place, which in turn helps to support government initiatives to maintain the quality of the air we breathe.

Issues such as defective rope seals on the doors of appliances can allow for increased air to enter the fire, leading to overfiring conditions. This will not only cause the appliance to be difficult to control leading to increased fuel consumption, it may also interfere with the correct functioning of the combustion system leading to increased emissions.

Appliance manufacturers will often detail regular service procedures within their installation instructions, some of which are to be carried out by consumers more frequently than an annual service by a qualified service engineer. In highlighting these points, installers, sweeps and consumers can play their part in ensuring the appropriate maintenance and sweeping schedules are in place, and raising awareness on simple steps that can be taken to prolong the life of the appliance and chimney, whilst at the same time maintaining a safe installation. These include:

## Appliance Servicing

- The appliance is de-ashed on a regular basis, with ash being disposed of in a safe and effective manner. For multi-fuel appliances, the ashpan should be emptied regularly to stop the build-up of ash on the underside of the grate.
- Door rope seal is in sound condition and no spillage of products of combustion occur whilst in operation.
- Appliance door glass is free from cracks and structurally sound.

- Appliance baffles are not distorted and are free from debris. Debris checks of the baffles should be checked on a regular basis when the appliance is cool and preferably before each firing session.
- Air controls move freely and remain smooth to operate.
- Any appliance door handles enable doors to close and seal fully and operate smoothly.
- Ensure only appropriate fuels are burned on the appliance as recommended by the appliance manufacturer.

Additional checks may be required dependent on the appliance manufacturer's guidance. The appliance manufacturer's maintenance and servicing instructions should always be referenced to ensure the appropriate servicing routine is followed.

### Chimney Maintenance

- The chimney/flue shall be cleaned regularly to remove all soot deposits and to prevent blockage. This should be done at least once a year for smokeless fuel burning, and at least twice a year for wood, preferably before the heating season to check that the flue has not been blocked by birds' nests, and also at the end of the heating season to prevent soot deposits from resting in the chimney during the dormant period.
- When using a new installation, especially in cases where an open fire has been replaced with a closed appliance/stove, the flue-ways should be checked at least monthly, so that an adequate maintenance cycle can be determined in relation to use of the new appliance. N.B. Even when cleaned, established deposits from open fires that form under cooler conditions may subsequently be loosened when exposed to the higher temperatures of operation with a closed appliance/stove. This can lead to "soot falls" so it is important to check the top surfaces of baffles very regularly during the first season of firings of the new appliance.
- The risk of heavy tar and soot deposits is greatly increased if unsuitable fuel is burnt, which can result in a chimney fire or corrosion damage.
- Check any terminals, rain caps, bird guards etc, are free from debris and cleaned appropriately.
- Check condition of the chimney stack, terminal and flaunching for any loose materials that may be easily dislodged and block the chimney.
- Ensure access is provided for the chimney to be swept throughout its entire length.
- Ensure the right size and type of brush of sufficient length is used to cover the complete chimney length.

These small steps can add up to a big improvement in optimising solid fuel appliance burning and reducing emissions, which in turn can reduce the risks to your own health and others around you. Visit the HETAS website to:

**Find a servicing engineer: [www.hetas.co.uk/find-servicing](http://www.hetas.co.uk/find-servicing)**

**Find a chimney sweep: [www.hetas.co.uk/find-chimney-sweep](http://www.hetas.co.uk/find-chimney-sweep)**

Do not reproduce or share this document without  
prior permission from HETAS

# Technical Bulletin #15

Sept 2019

HETAS Limited

Severn House, Unit 5,  
Newtown Trading Estate,  
Green Lane,  
Tewkesbury  
GL20 8HD



01684 278170

[info@hetas.co.uk](mailto:info@hetas.co.uk)

[www.hetas.co.uk](http://www.hetas.co.uk)