

A layman's guide to **CHIMNEY PROBLEMS AND THEIR SOLUTIONS**



Published by
CICO CHIMNEY LININGS LTD
THE THATCHED OWNERS GROUP
THE LISTED AND PERIOD HOMES GROUP





Introduction

This booklet is designed as a layman's guide to chimneys and their problems - and to the various solutions that are available. It is not intended in any way to be a comprehensive manual - there are technical publications that go into much more detail for readers who want full information.

Initially this guide explains the working of the chimney and then lists some of the problems that are frequently encountered. Finally it summarises a variety of solutions that can be employed to solve these problems. Particular mention is made of thatch and high-risk properties as these require additional safety measures.

If you are unlucky enough to experience any of the problems this guide covers we hope it will set you on the path to a satisfactory outcome.

Building Regulations

It is a requirement that all chimney lining work be carried out using tested and approved materials, installed to an approved code of practice. The CICO Chimney Lining System has been rigorously tested to meet these requirements and awarded the designation T600 N2 S D3, the highest for this type of lining. Installation can only be carried out by trained and accredited installers.

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How a chimney works

Although a chimney, or more correctly a flue, may seem to be a simple means by which smoke and fumes from a fire or stove escape to the open air, it is in fact a complex matter which must be designed and built correctly so as to do its job efficiently.

In its most basic form a chimney or flue is a continuous duct from the room to the outside air. Because it is closer to the ground the air pressure in the room is greater than the air pressure at the top of the chimney, and it is this pressure difference between the two that creates the main upwards air flow through the chimney. In order to work there must be enough pressure difference, and therefore chimney height is important. The flue must be intact with no holes along its length to break the pressure difference. It must also be of the correct size for the fire it serves – big fires need big flues.

Smoke and fumes from a fire or stove contains substantial amounts of carbon monoxide, a highly dangerous, odourless gas. They also often contain corrosive hydrocarbons and sulphur. In a well designed flue hot smoke and fumes rise up the chimney and out to the open air. However where a flue is of the wrong size, too cold, or badly built the fumes can cool substantially as they rise, allowing the corrosive elements to condense out onto the flue walls in the form of tar or acid. These corrosive elements can slowly eat into the flue and chimney walls.

The flue must be the right size for the fire or appliance. An open fire burning coal or logs sends most of its heat up into the chimney and thus even a large flue will remain warm enough for the smoke and fumes to rise quickly and efficiently. However some stoves or modern heating appliances give so much heat to the room or central heating that very little heat goes up the chimney. Flues for these appliances must be narrower, and well insulated to keep as much warmth in the fumes as possible as they rise, to avoid condensation.

Many coal and log effect gas fires also require a flue which is suitable for a normal solid fuel open fires.

Ideally a chimney should be as straight as possible as bends slow down the smooth passage of the fumes as they rise. Where chimneys do have bends they should be of a shallow angle and as smooth as possible. The insulating properties of the flue becomes even more important in such cases.

A chimney must be kept clear of debris and obstructions along its length. CICO recommend sweeping twice a year, by a qualified chimney sweep who will give a certificate after cleaning. Sweeping not only cleans soot and tar off the flue, but also ensures it is free of debris such as nesting material.

The size of the flue is critical to the working of the fire. A small fireplace should never be opened up or enlarged without considering the size of the flue in place and its suitability for the new fire size. If this is not done the new fire may not draw, blowing smoke back into the room. This work should therefore only be done after consulting a chimney engineer, who will be able to advise on such matters.

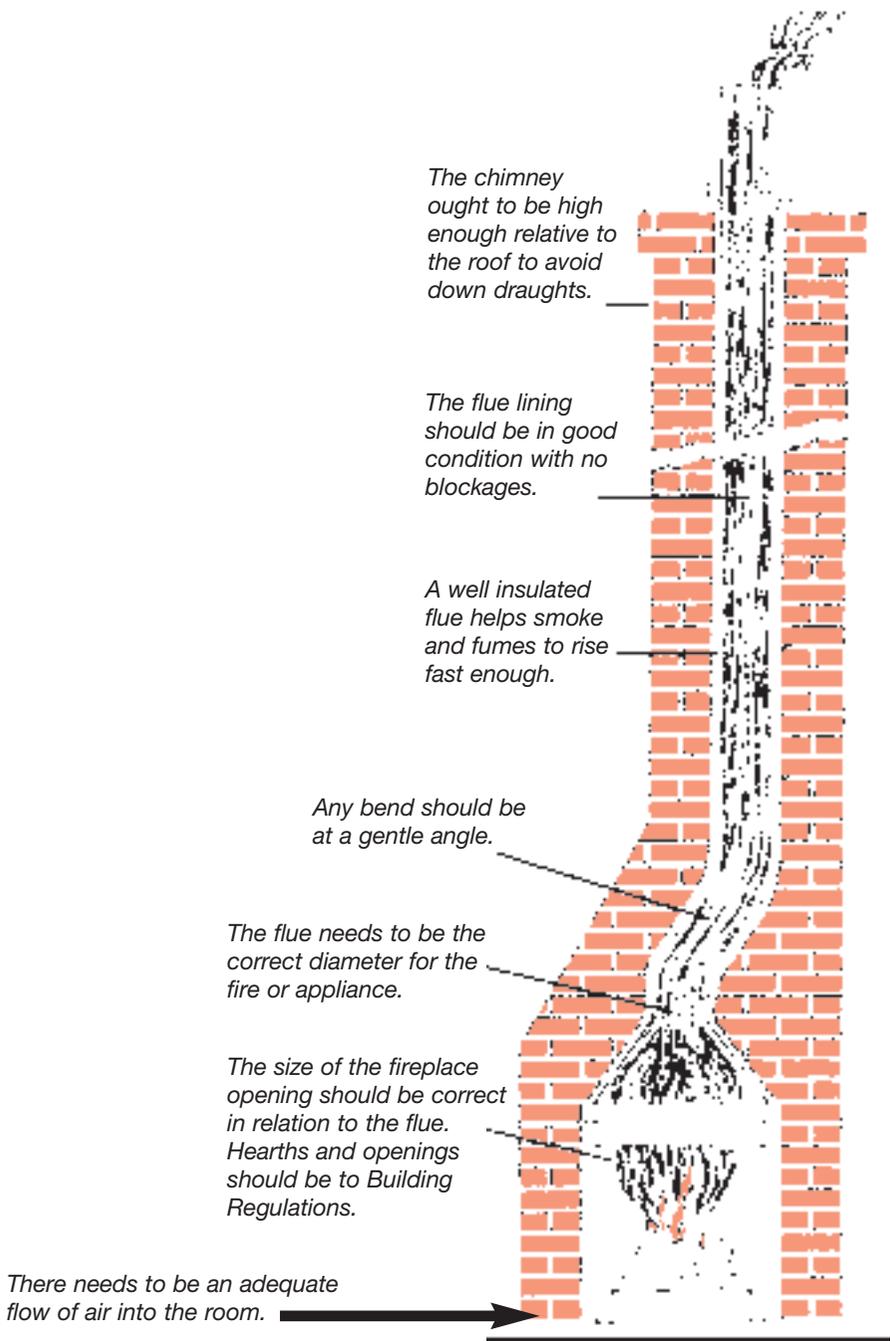
A chimney does not just take unwanted smoke and fumes away. It also creates an updraught of air from the room into the fire, some of which provides oxygen for the fire itself, with the rest rising up the chimney as it is warmed by the fire. In open fires this updraught can be significant, and in some cases will create a partial vacuum in the room which affects the working of the fire. There can also be safety problems from oxygen depletion in the room. It is therefore important to provide air ventilation to allow replacement air into the room as the fire burns. The larger the fire the more ventilation required. This equally applies to stoves and other appliances.

In older houses a fume tight flue was created as the chimney was built by lining the inner surfaces with lime mortar 'parging' (cow dung was used in very early days!). these parge linings will last for many years with open fires, but can eventually crack and disintegrate, particularly when exposed to the effects of a stove or appliance.

As of 1966 all new houses must have separate linings built into their chimney stacks as part of their construction. Clay liners are the cheapest and most commonly used method of meeting this requirement, however such liners have not always stood the test of time satisfactorily and in an effort to produce an improved form of lining other factory made linings have been developed.

Clay liners and most other factory made liners are jointed, and thus builders have to be very careful to ensure that joints are fume tight, particularly at bends. Also site handling and storage is an issue as these liners are easily damaged. The main other concern with this type of liner is that the installer is generally untrained in this work and thus errors in installation are very common. The most frequent of these is that the liners are installed upside down, leading to leakage of condensate and fumes. As the flue is made up of short lengths incorporating commonly up to 30 joints the potential for mistakes and failures is very high, with serious consequences.

From the above we can see that a chimney is an important safety element in a house that needs to be designed and maintained carefully from the outset, and considered carefully when changes are made throughout the life of the building.



The chimney ought to be high enough relative to the roof to avoid down draughts.

The flue lining should be in good condition with no blockages.

A well insulated flue helps smoke and fumes to rise fast enough.

Any bend should be at a gentle angle.

The flue needs to be the correct diameter for the fire or appliance.

The size of the fireplace opening should be correct in relation to the flue. Hearths and openings should be to Building Regulations.

There needs to be an adequate flow of air into the room. →

Some typical chimney problems

The following are some of the most frequently encountered problems which are the result of inefficient or deteriorating chimneys, together with an indication of the likely causes.

The fire is not drawing properly

This is usually the result of a cold or an obstructed flue or it can arise from insufficient height relative to the ridge of the roof or an adjacent building. Large unnecessary voids at the base of the chimney may also stop the fire drawing properly. Sometimes double glazing and very efficient draft excluders round doors, etc, may prevent an adequate flow of air for the fire to work correctly.



The fire creates excessive soot

This usually means a lazy and inefficient flue although some bituminous coals are particularly prone to this. Such a flue may not be the right diameter for the fire or stove or may not be satisfactorily insulated so that the fumes do not rise fast enough and therefore create soot deposits. Excessive soot and tar can be a considerable fire hazard particularly if the chimney structure has deteriorated; or where, on 19th century property for example, floor joists have been built into the stack, when the whole house can be at risk.



Mortar falls into the fireplace

Bits of brick or mortar falling down the flue indicate a serious deterioration in the chimney structure. Such deterioration normally occurs from the inside of the flue but if there is any indication of weakness on the outside of the chimney then attention is obviously necessary.



There are fumes in the rooms

These may not be easily detected on closed appliances although if, with an open fire, the chimney smokes back into the room they are then obvious. Fumes contain carbon monoxide and are dangerous. Where there are leaks in the chimney the fumes can find their way into upstairs rooms and attics. Sometimes a tell-tale smoke stain around the edge of a carpet shows the presence of fumes.



The chimney breast feels hot

This means that the chimney has deteriorated and may be dangerous. A hot wall in the room above may be a similar symptom. If stains also appear on the chimney breast this is a sign that tar or acids have condensed and are eating into the chimney mortar and brickwork.



The fire or stove is using too much fuel

Large uninsulated flues require a lot of heat and fuel to make them draw. In particular high efficiency modern appliances have only a relatively small outlet pipe for the fumes. If these discharge into a much larger uninsulated flue, their rise can be decelerated to the point when the appliance just will not draw. An insulated flue of the correct size is required to ensure that an adequate draught is created for them to burn as their designers intended. Otherwise they will use too much fuel and the slow moving fumes will also condense into acids which will attack the internal surface of the chimney.



Fire Risk?

Tar and soot deposits are a considerable fire risk, combine this with poor chimney structure or floor joists built up into the stack and the whole house is at risk.



What are the answers to these problems?

At the simplest level, if a fire is not drawing properly it may be because there is an insufficient flow of air into the room. First have your chimney swept. If the problem persists try leaving a door ajar and if this solves the problem then the removal of a draught excluder or the addition of an air brick may be all that is required.

Sometimes a chimney has been poorly designed and terminates below the apex of the roof. In certain wind directions this can lead to a high pressure zone which prevents updraught and the chimney may need to be extended above the ridge of the roof.

However, the most likely solution is that the flue itself needs attention because most of the problems we have described arise from an unsuitable or deteriorating condition of the flue.

It is always advisable to have the chimney swept by a professional sweep. This will usually reveal whether there are any obstructions and a good chimney sweep will often be able to tell you about the state of the chimney and its lining.

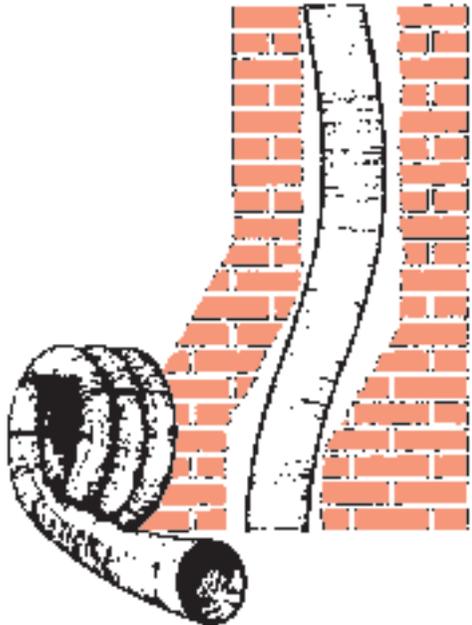
If the trouble is that the chimney or its lining has deteriorated, that there are cracks and leaks, that the flue needs to be better insulated or that the flue is not of the right size, the solution will be to install one of the various types of liners available which must comply with Building Regulations.

It is possible to carry out further testing and examination of the chimney by smoke test and CCTV camera if necessary. Where any relining or repair work is required it must be carried out by trained, competent installers who can certify their work upon completion.

Single skin flexible tube

This is a flexible single skin metal tube usually 125mm or 150mm in diameter. It is normally suitable for high performance radiant gas fires or enclosed gas effect stoves, where a relatively small flue without insulating properties is satisfactory, but it is not suitable for solid fuel, oil or decorative fuel effect gas fires.

However, when one of these liners is installed in a chimney previously used for burning coal or wood, then the metal of the lining can be eaten away in time by the tar and acid deposits at the points where the liner touches these in the chimney. Chimneys should therefore be thoroughly cleaned of soot and tar deposits prior to installation.



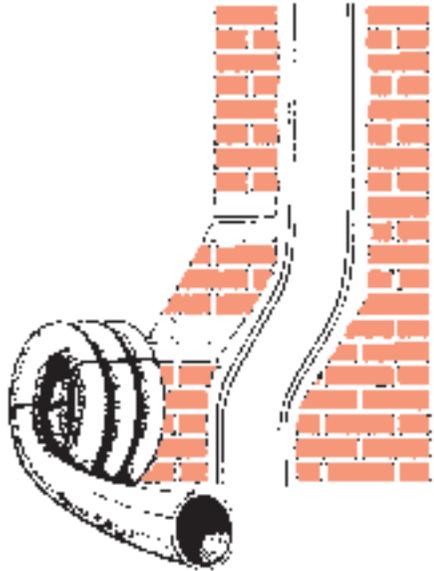
Stainless steel liners

There are several types of double skin flexible or double skin rigid steel liners. They come in various diameters and can be suitable for gas, oil or solid fuel. They must be installed correctly to the manufacturers' instructions and, before relining, the chimney must be thoroughly cleaned of all soot and tar deposits.

Whilst the gap between the liner and the chimney walls is often left as an air space, many manufacturers recommend that the gap is filled with insulation to increase the efficiency and the life of the liner. This may require access holes to be opened up at difficult bends or other obstructions.

Such liners cannot be considered to be permanent systems as they will corrode in time and require replacement.

Whenever possible the use of flexible stainless steel liners should be avoided when installing a stove type appliance in a thatched property.

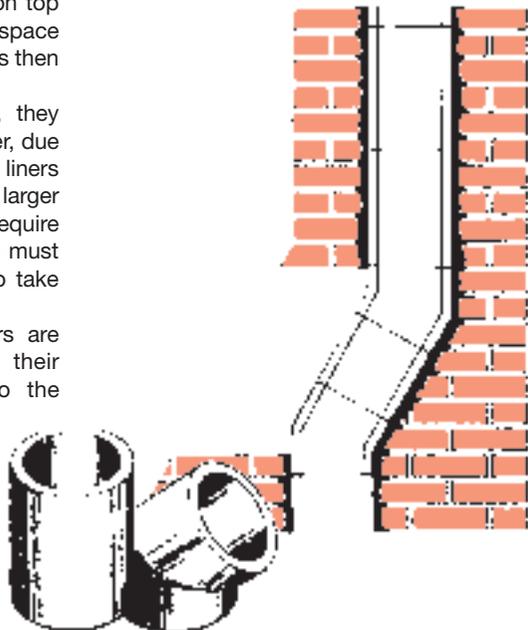


Insulated pre-cast liner

These liners are installed one on top of the other to form a flue. The space between the liner and the existing flue is then filled with insulating material.

If they are installed correctly, they make a high performance flue. However, due to the excessive thickness of these liners they are normally only suitable for the larger chimney. 9" square chimneys which require an 8" flue to suit the fireplace opening must be enlarged throughout their height to take the liners - a difficult process.

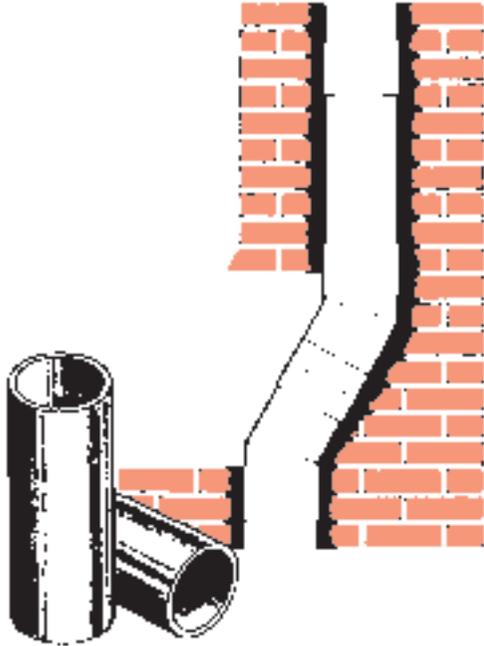
Some of these types of liners are Agrément Board approved and their guaranteed life varies according to the supplier.



Ceramic liners

These are rigid lengths of lining made from a ceramic material and are installed one on top of the other to form the flue. They are located by a metal collar and jointed with a high temperature resistant compound. They give a heat proof lining and good insulation providing the space round the lining is filled with an insulating material.

Where the characteristics of the appliance or fireplace require a 200 mm (8") diameter flue, this can be attained in a 9" square chimney due to the thin wall of the liner. For the ceramic liners to be inserted and correctly centralised, adequate openings are made at bends in the chimney.



Cast in-situ linings

This system involves the insertion of an inflatable former into the chimney from the top. When inflated the former is carefully centralised throughout the length of the chimney and to do this access holes are opened near bends in the chimney. A highly insulating refractory mix is pumped down from the top of the chimney between the former and the chimney walls. This is left to harden and then the former is deflated and removed.

The advantage of this system is that being non-metallic it does not corrode nor are there any joints to work loose and leak. Not only is a well insulated flue of the correct diameter created but, at the same time, the chimney is strengthened because the insulating compound fills any cracks and holes in the brickwork. This type of liner is suitable for all fuels including wood as well as coal, gas and oil.



CICO Chimney Linings

Although many different lining systems are available the most important factor to bear in mind is that no matter how good the product - it is only as good as the installation. Chimney lining requires care and attention to detail to make sure that you are going to get a quality installation and this is not necessarily the cheapest. Defective flues are dangerous and can kill people.

Because of its many advantages CICO Chimney Linings, the publishers of this booklet, specialise in the cast in situ system and have become one of the best known installers in the country. The system is the only one of its type to hold a British Board of Agrément certificate and both the materials used and the installation process are subject to rigorous quality control. Only trained and approved installation teams are able to install the CICO Chimney Lining System and teams are subjected to site inspections to ensure that installations are carried out to the CICO code of practice.

The British Board of Agrément gives the CICO Chimney Lining System a life expectancy of 60 years.

Where to go for further information

Most appliance manufacturers provide recommendations as to the type of fuel to be burnt in particular models. Incidentally, for wood burning a general rule is 'the longer the wood is seasoned and the drier it is, the better', as green wood frequently results in the creation of tar. A highly insulated flue is therefore essential in order to minimise this.

There are also special requirements for flues serving fuel effect gas fires and these are explained in a separate leaflet which is published by CICO and available from its branches.

There are CICO branches throughout the country and each manager is trained as a chimney expert. He will conduct a survey without obligation and give advice on any of the chimney problems - this can often save unnecessary expense and inconvenience and ensure that the most effective solution is chosen at the outset.

In addition to relining, many branches offer complimentary services such as CCTV surveys, insurance reports, stove and fireplace installation and fume assessment.

The telephone numbers of CICO are listed on the enclosed sheet.

The British Board of Agrément

The British Board of Agrément is an independent Government-backed body established to inspect and approve building materials and processes. When you select a product which has an Agrément Certificate you can be sure that it has been put through a rigorous test and assessment programme by the BBA. Each Agrément Certificate includes key statements on durability, installation and performance and, of course, compliance with Building Regulations, not only in England and Wales, but in Scotland and Northern Ireland too.

The symbol illustrated here shows the number of the Agrément Certificate which has been granted to CICO and which covers the testing and approval by the BBA of both the CICO process and its installation.

Thatched and High Risk Properties

All stoves, open fires and other solid fuel appliances must be installed correctly by competent installers, and used as intended with the correct fuel, in all properties. However thatched properties pose particular concerns which require specific, added safety measures to minimise the risk of fire.

In recent years accepted opinion as to the cause of chimney related fires in thatch has changed somewhat.

Traditionally it was thought that the majority of such fires were started by embers and sparks landing on the thatch, either in normal use or as a result of a chimney fire.

However, whilst these remain as danger areas, recent research and investigations by RHM Technology have revealed that a far more common cause is heat transmitted from within a chimney serving a solid fuel stove, through the brick of the chimney itself, to the underside of the thatch. In controlled tests scientists at RHM Technology proved that charring and slow combustion can occur in thatch surrounding a chimney at a temperature of only 200 degrees C.

A single skin of brick can, after a length of time, allow as much as 85 percent of the flue gas temperature to pass to the outer surface of the chimney and into the thatch that surrounds it. When you consider that modern high efficiency stoves can generate flue gas temperatures in excess of 300 degrees, and up to 400 degrees in some cases, you see that the critical temperature of 200 degrees could be achieved and sustained with relative ease.

The situation is compounded by the common practice of overlaying existing thatch with new when repairs and maintenance are carried out. This leads to an increase in thatch thickness over the years and it is not uncommon for thatch next to a chimney to be as much as 1-2 metres thick. This hugely increases the surface area of thatch in the critical area around the stack.

Furthermore, the condition of the chimney brickwork within the thatch layers is usually the worst in the chimney as it is not easily accessible for maintenance, and is situated just below the cooling point of the chimney and thus suffers from internal corrosion as well. Obviously poor brickwork will allow even more temperature transmission in this critical part of the chimney.

We strongly recommend fitting a temperature early warning system such as the Chimney Temperature Monitor distributed by the Thatched Owners Group. This unit will sound an alarm well before the chimney temperature reaches critical levels, and again when there is a real fire risk. Using modern communications the alarm signal can be sent to any phone or receiver of your choice as well as sounding in the property.



Thus, by taking sensible precautions, using appliances correctly with the right type of fuel and with properly installed flue liners in place you can minimise the risk of a chimney related fire in your thatched property.

Many insurance companies now ask for a detailed survey and risk report before agreeing to insure or renew premiums on thatched properties with stoves and fires. With this in mind CICO Chimney Linings have introduced their ChimneyPlan inspection service for high risk properties, such as thatched and period homes.

Thatched Owners Group We Are Here To Help

If you own a home with a thatched roof, Thatched Owners Group can help with all the information and advice you will ever need.

We have a specialist thatch house insurance division; we offer advice on owning a listed building; contact details for roof thatchers in your area; financial advice on grants for re-thatching and VAT exemption for owners of listed buildings; fire safety information and products and a complete directory of all the specialists products and services you could ever need for your perfect thatched cottage.

We will provide advice and assistance in the renovation and repair of your thatched house, and have a network of advisors and specialists on hand to give you, the homeowner, the help you need.

Thatched cottages still represent a traditional image of rural life that is instantly recognisable around the world. For many, owning a typical thatched cottage represents the epitome of rural England. The Thatched Owners Group is here to help you enjoy living under thatch, wherever you may be in the UK.



In addition to our thatched services we run our Listed & Period Homes Group to offer similar advice and services to homeowners in this important sector of our building heritage.

ChimneyPlan

Introduced in response to growing demands from Insurance companies, landlords, local authorities and safety conscious householders. CICO Chimneys have introduced ChimneyPlan, a standardised chimney survey scheme

For an agreed fixed fee, using specialised survey equipment including CCTV where necessary, your ChimneyPlan surveyor will report on all aspects of your solid fuel installation. A detailed written report is provided along with recommendations on any work required

Although suitable for all properties, ChimneyPlan has been developed in close conjunction with the Thatched Owners Group, the UK's foremost thatched and period building specialist.

For a monthly fee ChimneyPlan can also provide an ongoing chimney and fire maintenance plan including annual surveys and preferential call-out times in case of problems. This service should be of particular benefit to landlords.

Enquiries for ChimneyPlan should be made through the CICO Head Office or by e-mail to chimneyplan@chimney-problems.co.uk

To find out more about CICO Chimney Linings or
ChimneyPlan call

0500 833787

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