HEATING YOUR CHURCH

Each church building needs to be considered as a special case of its own – there is no blue print answer on the best form of heating. Parishes considering heating of their church should consult the DAC at the earliest possible time. They will be pleased to help and assist through their heating adviser.

The DAC is of the opinion that the best form of heating for a church is a traditional 'wet' system of radiators and pipework operated by a modern gas-fired boiler and controlled by modern timing and thermostatic/humidistat equipment. Oil can be used as an alternative fuel where a gas supply is not available.

Electrical heating may be appropriate in small churches and where the building is seldom used during the course of the week. It is not likely to be appropriate for larger churches or for those where there are several Sunday services or frequent services during the week.

With regard to more modern heating technology, alternative heating systems such as air source heat pumps and ground source heat pumps are now being put into more widespread use. It is important for parishes to note that there is as yet very little concrete evidence on how well these systems will operate in church buildings. The Committee feels that the general parameters of visibility, reversibility, durability and longevity can be applied to consideration of these areas of new technology and each case must be determined on its own merits. With this in mind, the DAC encourages parishes to come for informal advice at an early stage.

<u>How to set about installing a new heating system</u>

The following checklist may be helpful.

- ❖ Write down a list of your needs.
  - prepare a schedule of church services and meetings or events that are held in your church
  - prepare information on numbers of people who use the building and the areas that need heating.

- ❖ Make contact with the DAC at Diocesan Church House and ask to be put in touch with its heating adviser. When you have a proposal, ask the DAC for informal advice.

- ❖ Tell your inspecting architect of your wishes and requirements and seek his advice.

- ❖ Discuss with your architect and the DAC adviser the names of suitable and good heating design engineers. Meet with them and make a decision to appoint one of them.

- ❖ Visit other churches that have a similar heating system as that which you think you would like: talk with some of the congregation who are the users!

- ❖ Ask your selected heating engineer to design the scheme and cost it. Ensure he works closely with your architect – heating systems have a considerable impact upon a church building, and often have important implications for the fabric of the church building and its contents.

- ❖ Submit a formal application to the DAC for approval of your scheme. This should be accompanied by:-

  - A technical specification of what is proposed, supported where appropriate by heat loss or heat requirement calculations.
  - The proposed system of operation and the method of control
  - A brief description of what exists at present and the reasons for the proposed new works.
  - A plan drawing of the church suitably marked up by the heating design engineer or architect to show the size

and position of pipes, radiators, heaters, etc.
- Technical literature illustrating the form of radiators or heaters proposed.

❖ If your proposals have been carefully prepared and well thought through, following the advice available, it is likely that your application will succeed and be the first step towards the Petition and Faculty.

❖ If your church is a listed building, then it may be wise to consult English Heritage at an early stage. Discuss the matter with your inspecting architect or seek advice from the DAC office at Diocesan Church House.

Notes on a traditional wet system

This type of system comprises of a gas or oil fired central heating boiler, distribution pipework and radiators which will provide the best form of heating and will also provide background heating to protect the fabric of the church.

❖ **Fuel**

Gas is preferred. It is the cleanest & least expensive fuel and attracts less maintenance costs.

Oil means on site storage, delivery access, and higher boiler running & maintenance charges for the pressure jet oil burner.

❖ **Boilers**

Gas boilers of the atmospheric type can generally be located anywhere. The flexibility of the flueing system allows the boiler to be sited up to 6 metres from an outside wall. Flue gases can discharge at 2.5 metres above the ground and no longer require a dedicated chimney.

Oil fired boilers are not so flexible and most must be located in a dedicated boiler house with a vertical chimney to roof level. Some of the lower output boilers are now available with a low level discharge balanced flue.

❖ **Radiators**

Radiators can be of the pressed steel type (typical house type) or cast iron column type if required to match older radiators or deemed to be more fitting to the church interior. (The cast iron radiators are considerably more expensive than the pressed steel type).

LTS (low surface temperature) radiators are radiators with protective casings which limit the surface temperature to 43^{o}C. These radiators are only necessary to be installed for the very young (0-7 years) or for the elderly. Because their output is reduced by the casing they are both considerably larger and more expensive that the uncased type. LTS type radiators may be required in rooms dedicated to the young.

Radiators should be located evenly throughout the church and in all individual rooms.

❖ **Fan convectors**

Fan convectors are fan assisted heat emitters which pump out a lot of heat in one location. (A typical size is 1200mm long by 700mm high by 300mm deep which is rated at 6KW). The selection of fan convectors should only be considered when there is insufficient wall space for radiators. Although the fans are quiet on their lower speeds, it is desirable to turn off the fan facility prior to a service commencing, to avoid any intrusion due to fan operation.

❖ **Trench heating**

Many churches have existing underfloor pipe coils (usually down the nave) which do not dissipate enough heat. These ducts usually provide pipe routes to serve radiators but can also be adapted by the installation of 'finned' heating elements to provide a heating output along the nave. The existing patterned cast iron trench covers can generally be reused.

❖ **Controls**

One of the benefits of the wet system of heating is the flexibility of control. The minimum controls should be:

- 7 day electronic programmable thermostat with at least two periods per day
- Occupancy temperature (usually set at $18^{o}C$)
- Background/Frost temperature (usually a minimum of $10^{o}C$)
- Your Church architect may suggest a higher background temperature to protect the structure & minimise condensation.

Notes on electric heating

Electric heating is an option where a wet system cannot be installed. It is only suitable for small churches and although it is cheaper to install it is considerably more expensive to run and has less flexibility of use.

❖ **Electrical supply**

An adequate size electrical supply (usually 3 phase) must be available for heating purposes. In most cases this means a new supply.

❖ **'White' meter supply**

This is a dedicated meter installed on the electrical supply to the heating system. It means that any electricity consumed between midnight and 6am is at a cheap rate (approx. 6p/KWhr). It is recommended that any electrical heating system is designed to take advantage of the cheap rate.

❖ **Electrical storage heaters**

These are heaters which comprise of a core of high density bricks which store heat during the night time charge (usually 12 midnight to 7am) at cheap rate and slowly discharge the stored heat to the church via a combination of convection and radiation.

It is recommended that when selecting electrical storage heaters the heaters have the fan boost facility with optional daytime heating elements. This enables the storage units to dissipate more heat (via the fan) and also to switch on the optional heaters (via a timer) for an evening service.

Although the fans are quiet, it is common to turn off the fan facility prior to a service commencing to avoid any intrusion due to the fan operation.

❖ **Fan heaters**

These heaters come in many sizes but are only suitable for individual rooms and provide instantaneous heat. They do not use cheap electricity. The heaters can be wall or floor mounted.

❖ **Panel Heaters**

These heaters are wall mounted and operate via the ordinary electrical supply to supply heat at any time. They are again only suitable for small individual rooms but can operate automatically over 24 hours via built in thermostatic controls.

❖ **Under pew tubular heaters**

These heaters are only suitable for providing a minimal background heating for frost protection. Although many churches have this type of tubular heater fitted beneath the pew they have not proven to be satisfactory due to their limited output and long heat-up period before any effect is apparent.

❖ **Air curtains**

The greatest heat loss is due to the ingress of cold air from open doorways. An electric over door heater will help to combat the cold ingress of air but are expensive to run as an output of 9/12KW is required to make them effective.

❖ **Running costs**

If there is no alternative to electrical heating it is essential to ensure that the main heating output is obtained at 'cheap rate' with any daytime supply being used for 'top up' purposes. The fabric of the church can only be protected by the installation of the storage type of heaters which dissipate heat over 24 hours.

❖ **Notes on electrical radiant heating**

This form of heating is considered to be the most unsatisfactory and obtrusive form for most churches. Its use is very limited as it is not acceptable visually, uses ordinary electricity, and does not provide any background heating to protect the fabric.

The heating supplied by these infra red heaters is instantaneous which beams radiant heating to the congregation. Although the effect of the heating is immediate many people suffer from 'hot heads' and 'cold feet'.

Heaters of this type would generally be mounted on the walls at 3 – 4 metres high. Ceiling mounted models, hung from chains, are also available.

As with any other electrical work, the DAC will need to have a full copy of a recent electrical test certificate as part of the application.

❖ **Notes on gas fired convector heating**

Where gas is available, direct gas fired fan assisted fan convectors may be considered.

Most manufacturers offer a range to suit varying sizes of rooms.

The modern gas convector has electrical ignition and can be time clock controlled but it is generally used as a manual heat emitter. It offers quick heat up periods.

The location of gas fired convectors is critical as they must be located on an exterior wall to allow for the combustion air and flue gases to be emitted. Under no circumstances must the flue gases be allowed to dissipate into the occupied space.

The downside of gas fired convectors is their size as they are usually 300mm deep. Many gas convector front

plates get very hot which means that a front guard must also be fitted for protection purposes. As a result of this they must be located in open areas and not adjacent to furniture or fabrics.

The installation of gas piping to serve the convectors must also be considered. Under Gas Safety regulations any concealed gas pipework must always be run in a ventilated duct. It is therefore recommended that gas pipework is run in an exposed position to meet current regulations in this respect.

- **Oil tank legislation**

All Non-Domestic oil tanks must now be bunded to prevent pollution by spillage of the contents. A bunded oil tank can be:

a) an integral bunded prefabricated tank (usually plastic)
b) a masonry or concrete bund around an existing tank to a height able to contain 110% of the oil tank capacity

The legislation applies to all public sector buildings, including churches.

If it is necessary to relocate the oil tank, your architect must meet the current building regulations with regard to fire protection if it is adjacent to any part of a building. For tanks up to 3500 litres capacity no precautions are necessary if the oil tank is located at least 2000mm from the building or a boundary line. If this distance can not be met a fire barrier rated at least 60 minutes should be provided extending 900mm higher & wider than both ends of the tank.

For tanks larger than 3500 litres the restrictions are more onerous and difficult to accommodate.

Planning permission may be necessary for relocating an oil tank and parishes should check this with their local planning authority.

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