Under Pew Heating

Summary: A direct form of electric heating designed to provide heat where people are and not to heat the whole space. Suitable for churches with fixed pews and an occasional usage pattern.

Brown BN Thermic 650W under pew heaters fixed to underside of pew seats for pews which have no solid backs.

What is under pew heating?

Electric under pew heaters are relatively **simple electric heaters that are installed under the pew seat or in front of the pew**. They usually provide a high level of thermal comfort to people sitting in the pews. They are not installed to try and heat the entire air volume of the church, instead thermal comfort is achieved through a flow of warm air rising past the person in the pew. This means that the heaters should be installed under the entire length of all the pews that are likely to be used. These heaters have no fan or such like installed on them and therefore they are silent.

Black 650W Norel under pew heaters fitted to solid pew backs

These heaters warm up almost instantly and a flow of warm air over the pew area is created within around 15 minutes of them being turned on. This significantly reduces the amount of preheating required before each use of the building and can make electric heating cost competitive with gas. It is important that this reduced 'on time' is properly reflected in any comparisons with other types of heating. Under pew can provide a solution to replace gas or oil boiler-based systems in churches with fixed pews and therefore forms a major solution in the decarbonisation of churches.

The technical bit – how do they work?

The units are a simple resistive heating element surrounded by a metal casing. The modern under pew heaters are all designed to be low surface temperature and therefore do not require additional guarding.

They are typically fixed using timber screws, to the underside of the pew seat using L-shaped brackets. They can be positioned far enough back so that they do not conflict with the heels of those kneeling and allow for the toes of those sitting in the pew behind (if it has an open back) to slide their feet out in an extended position without hitting the heater. The heaters are best installed with a switch at the end of each pew, so the person in the pew can switch it off if they find it too warm. The heaters can be wired in a number of circuits to create 'zones', allowing some areas to remain off if not required. They can be controlled though any means including a timeclock as for traditional boiler systems, or by modern wifi controllers. As the warm-up time is so short, most churches find that a simple set of switches (one for each zone) is the most suitable, with a church member turning on the heating as required when they arrive to prepare for a service. Timer switches can also be used so they automatically turn off again after a couple of hours and cannot be accidentally left on.

Suitable churches – are they for us?

Electric under pew heaters do consume a significant amount of electricity when they are all on, but they are only on for a short period of time. Therefore, they are best suited to churches that are used mainly for Sunday and festival services and have few activities at other times.

As the heaters are fixed to the pews, the church does need to have fixed pews, and they should consider the implications for their heating if they plan to remove pews as part of a reordering. The heaters should not be fixed to medieval timber pews and are a List B matter if the pews date from after 1850.

Pros and Cons

Pros:	**Cons:**
Under pew heating provides good levels of thermal comfort (typically an improvement on boiler-based systems where radiators are located away from the main section of pews) as they provide heat directly under where people are sat.	Under pew heating systems heat people when in pews, there will be some 'heat spill' but the aisles and other areas of the church will not feel warm. Supplementary panel heaters are likely to be required for areas which do not have pews (such as behind the altar, around the font etc.)

Pros:	Cons:
Electric under pew heating is generally cost effective to install and run. They can be installed in phases to suit available budgets. The churches which use electric-only solutions such as under pew are almost always found to have the lowest energy bills of all churches. As the heaters are located under the pews, they free up wall and floor space where existing radiators may be a constraint. A smaller under pew system can be installed using a single phase electricity supply, removing the need for a potentially expensive upgrade. A single phase 100A electricity supply will generally be able to support enough under pew heaters to heat pews for around 50 people. Under pew heaters do not require any specific annual maintenance. They will be included in the 5-year fixed wire testing that is required for churches. The units can be expected to last for 25+ years with the wiring lasting much longer. As the units tend not to fail all at once, the replacement tends to be for a few units at a time and therefore incurs no major high capital replacement cost in the future. They can be installed under a List B permission relatively quickly, which is helpful in emergency situations as well as for longer-term use.	There are rare cases where the heat output from the heaters is lower than expected. This has been found to be due to low electrical voltage being supplied to the church. The incoming voltage should be above 230V for good heat output to be achieved. If it is lower than this, larger heaters should be installed. Some styles of heaters have a narrow linear strip at the top of the heater. For these styles some people comment that they can feel a distinct line of heat on back of their legs which if not covered by clothing can give a slight sensation of burning. This can be avoided by installing a style of heater that has a broader heat output. Around 18kW of pew heaters can be installed on a 100A single phase electricity supply. A pew that seats between 3 to 4 people will typically accommodate pew heaters of around 900W and therefore a single phase 100A supply can heat around 20 pews so may be sufficient to heat 10 rows either side of the nave aisle. To heat more pews than this, an additional 100A single phase, or a three phase 100A supply will be required, to supply enough power. This may require an upgrade of the existing electrical connection, which can be costly (but quotes are free). The cabling of the electricity to the pews can require careful consideration. Routes can often be found running down old heating floor trenches or under raised timber pew platforms. The lifting of some specific floor slabs may be required to run a cable route in certain circumstances. It is normal to use armoured cabling when running below ground and FP200 gold cabling to the individual heaters above ground. This FP200 cabling can be painted to match background colours if required.

<u>Many churches in the diocese have installed under pew heating including:</u>

St Peter's, Brimpton, near Newbury (2023)

White Waltham Church, near Maidenhead (post 2016)

Holy Cross, Shipton-on-Cherwell (~2011 convector heaters)

All Saints, North Moreton, near Didcot (~2020)

St James', Little Milton, near Oxford

Holy Trinity, Shenington

St Mary's, Chesterton (older, radiant tube heaters)

Links to national case studies or relevant guidance

St Andrew's Chedworth – electric heating

Known UK product suppliers

BN Thermic

Norel (distributed in the UK by Electric Heating Solutions

Cooltouch Heaters (for use in front of pews)

Elkatherm

EcoSun

The above is a list of the known suppliers in the UK, it is not a recommendation of these products, or suppliers, which have different pros and cons. Efforts have been made to include all known suppliers at the time of writing. If further suppliers are known, please make the Diocese aware so that this list can be updated.

Estimated price brackets

Depending on the supplier selected, each heater typically costs between £100 and £250 each. The total project costs will depend on the number of pews, whether an upgrade to the incoming electrical supply is required and the difficulty of running cables to the pews. A typical installation within a church usually ranges from £8,000 (for a block of core nave pews from an existing electrical supply) to £40,000 (for all the pews within a church with a new electrical supply).

What permissions are currently needed under the faculty jurisdiction rules?

The installation of under pew heating is a List B matter under the changes in the faculty jurisdiction rules from July 2022. This is on condition that they are fixed to pews dating from after 1850.

Contact details of Oxford Environment Team for further support and information

environment@oxford.anglican.org

Church House Oxford, Langford Locks, Kidlington, Oxfordshire, OX5 1GF

This is one of a collection of heating guidance notes available here.