

## Overhead Infrared Heating

**Summary: a direct form of heating designed to heat people from above, not heat the space. Suitable for Sunday-use churches or as a booster to underfloor heating systems.**



*Herschel Horizon Wall Mounted Heater (Far Infrared) – computer generated illustration, not a real-life example.*

### **What is overhead infrared heating?**

Overhead infrared panel heaters offer a heating system which heats people, not the space. They make use of infrared wave lengths to provide a warming effect to surfaces, in a similar way to the sun radiating heat to the earth. This means there is no significant convective component – the air is not heated and so there is no warm air circulation. Radiant heaters come in a variety of forms; from the traditional models that emit a visible red-light glow (short wave), to medium wave unit (sometimes called ‘magic-lamps’) which emit pink/gold light, and the more modern long wave or far infrared (sometimes called ‘black heat’) units which emit no visible light. These all use infrared to provide heating but at different wavelengths, which have different properties. These heaters are silent and involve no moving parts.

### **The technical bit – how do they work?**

The short-wave, visible light units provide a strong heat in a narrow beam. This can give the feeling of a fierce form of heating directed onto people’s heads. The long-wave units provide a “softer” heat over a wider angle. Because the heat spreads out more, it has lower transmission but better absorption by the human body.

Each unit will have an operating range which will be dictated by its design and characteristics. The light commercial units tend to have a range - or ‘throw’ - of around 2.5m (therefore, a mounting height of between 3m to 3.5m is typical). Units mounted outside of their heating range are likely to give poor performance. Larger industrial or specialist heaters can have larger ranges and can be mounted at heights around 4.5m.

These heaters warm up almost instantly and as they heat people rather than the air, there is no need to turn on this type of heater for long periods prior to usage. Turning them on for no more than 30 minutes

before use can provide a minor benefit as they can help heat the surface of seats and floors. This is in contrast to typical gas or oil boilers, which use convective heating, and have significantly longer warm up times. These short warm up times can make electric heating cost competitive. It is important that this reduced warm up time is properly reflected in any cost comparisons with other types of heating.

### **Installing overhead infrared heating**

The temperature of the units themselves can reach very high temperatures and therefore these should be located out of reach of any person and away from direct contact with sensitive elements of the building fabric, including timbers. Some of the modern designs of heaters provide all the heat from the front of the unit with negligible levels of heat being emitted from the back of the heater.

Each heater can be switched on independently so the heaters can be used to provide a 'zoned' heating approach.

There are no annual maintenance requirements and the heaters would be included in the 5 year fixed wire electrical test. (Any portable versions of these heaters would have to be included in an annual PAT test). The heat emitting elements (lamps or ceramic cartridges) can be expected to last for 15-20 years and these are normally replaceable parts. The rest of the unit is relatively simple and can be expected to last for 30+ years.

### **Suitable churches – are these for us?**

This form of heating provides heat from above and so can leave lower limbs and feet feeling cold; therefore, some people find this form of heating less comfortable, especially for longer periods of time. Comfort perceptions tend to improve in spaces where people are standing and more able to move around.

This form of heating also provides heating through direct line of sight with the heater, therefore if any part of the body is in 'shadow' formed by furniture or the like, that part of the body will not receive any heating benefit. Therefore, they are more difficult to use successfully in areas of bulky, fixed pews.

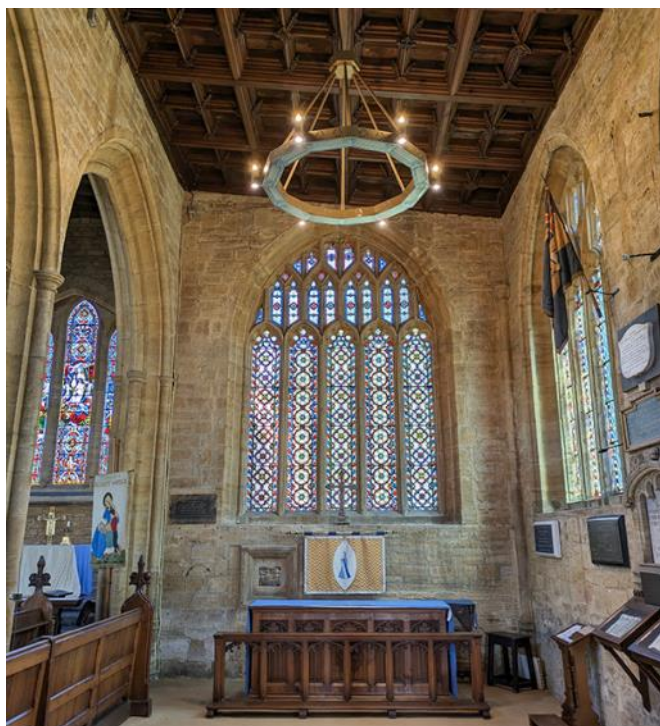
Overhead radiant heaters do consume a significant amount of electricity when they are all on, but they are only on for a short period of time. They are therefore best suited to churches that are used sporadically for periods typically less than 3 hours in length and for no more than around 5 to 6 such events in a week. For churches with over 20 hours regular use per week, operational expenditure will become high.

Therefore, this solution is most frequently used in 'Sunday use churches' and churches with minor sporadic weekday usage which have removed their pews in all, or large areas of, their church. It can also be used in conjunction with underfloor heating systems to provide an instant boost to the thermal comfort.

They may also be considered for specific areas where there are no pews, such as some chapels or circulating areas at the rear of churches.

## Pros and Cons

Pros:	Cons:
<p>Overhead heating can provide a heating solution to large, clear areas which allows for a flexible use of the space below.</p> <p>Heat people, not the air in the space. This means that they heat up quickly. It also means that there are no large temperature fluctuations within the building, which can be beneficial for the fabric.</p> <p>Given the short warm-up periods, this type of heating can be very cost effective to run when compared to gas and oil-fired systems, especially where there are a handful of weekly events, each with a duration under 3 hours.</p> <p>Around 18kW of electrical heaters can be installed on a 100A single phase electricity supply. Units often range from 2.5kW to 7.8kW, therefore 2 to 7 heaters may be able to be installed on a single phase 100A supply.</p>	<p>People often report having a hot head but cool feet and lower limbs which is not particularly comfortable for longer periods of time. This is more notable with short-wave versions of this type of heating, i.e. those emitting visible light. This attribute of the heater is less of an issue in areas where people are standing and able to move around over time, as they can then move in and out of the zone of heating in order to meet their comfort needs.</p> <p>As these heaters are mounted overhead, they do have a major visual impact inside the church building. More recent models of heaters have been designed with more attractive casings.</p> <p>The surface temperature of the heaters can become very high. This is a very localised issue to the immediate area around the unit, but it does mean that units located on walls need to be very carefully positioned away from any timber or other sensitive historic fabric. Note that locating these units close to timber wall plates has caused issues in churches where the timber wall plate has dried out to such an extent that it has crumbled and pieces have fallen into the church. Some of the modern designs seek to address this issue (with negligible heat at the back of the unit), but this does vary from one manufacturer to another so extreme care must be exercised.</p> <p>Around 18kW of electrical heaters can be installed on a 100A single phase electricity supply. Many installations for a complete church will require greater capacity and so a three phase 100A supply will be required to provide enough power. This may require an upgrade of the existing electrical connection.</p> <p>The cabling of the electricity to the units can require careful consideration, especially when they are located part way down a wall. Routes can often be found running in ceiling spaces.</p> <p>The suspended chandelier heaters give greater opportunity to locate the heaters away from sensitive fabric but have a more considerable visual impact into the building and may require some structural work to allow for them to be suspended. These chandeliers can also be provided with lighting as an additional option.</p> <p>People often report having a hot head but cool feet and lower limbs which is not particularly comfortable for longer periods of time. This is more notable with short-wave versions of this type of heating, i.e. those emitting visible light. This attribute of the heater is less of an issue in areas where people are standing and able to move around over time, as they can then move in and out of the zone of heating in order to meet their comfort needs.</p>



*Herschell Halo Far Infrared chandelier unit*

### **Churches in the Diocese of Oxford which have installed infrared heating:**

Note: where there are other forms of heating in addition to overhead radiant, the details are listed, because the radiant portion may provide insufficient heat on its own.

#### **St John the Baptist's, Caversham (Reading) 627447**

Congregation size: c.60. Use pattern: 11 hours per week, 4 hours on Sundays.

Type of heating: Radiant quartz 3 bar heaters in the nave, aisles, and chancel - 16 heaters in total, equalling c.48kW

Additionally, there are 1 bar radiant heaters in the vestry, kitchen and Sunday school room.

Annual electric use: 8,000kWh, of which heating is estimated at 5,500kWh.

#### **St Nicholas', Fyfield 627307**

Congregation size: c.25

Use pattern: 3 hours per week

Type of heating: 13 Dimplex pew back mounted convector heaters, additionally two radiant quartz infrared heaters at the rear of the nave, equalling 2-3kW each

Annual electric use: 5,000kWh, of which heating is estimated at 4,400kWh.

### **St Catherine's, Towersey 627024**

Congregation size: c.18

Use pattern: 3.5 hours per week

Type of heating: A combination of 35 pew back mounted infrared heating panels, with varying outputs to a total of 13kW, and high wall mounted radiant heaters - 8 in the nave, and 4 in the chancel estimated at 18kW in total. The rear circulation area has 4 convector heaters and a kitchenette plinth heater, to a total of 9kW. They use an estimated 85kW on Sundays in winter.

Annual electric use: 7,450kWh, of which heating is estimated at 7,000kWh.

### **St Frideswide's, Oxford 627218**

Congregation size: c.30

Use pattern: 2 hours per week, 4 hours on Sundays

Type of heating: 15 wall mounted electric convector heaters

Annual electric use: 12,000kWh

### **Links to national case studies or relevant guidance**

Church Care webinar [Electric Heating Solutions](#) - from pews and panels to chandeliers and cushions

[Radiant Heating Trial - St Matthew's, Bristol](#)

### **Known UK product suppliers**

[Herschel](#) (mainly far infrared heating)

[Electric Heating Solutions](#) (mainly near infrared heating)

[BN Thermic](#) (mainly commercial and industrial mid-wavelength units)

[Tan Sun](#) (mainly near infrared wall mounted heaters)

[M&P Studios](#) (France, glass chandeliers)

[Flexel / Fenix](#)

The above is a list of the known suppliers in the UK and the EU, it is not a recommendation of these products or suppliers which have different pros and cons. Efforts have been made to include all known major suppliers at the time of writing (it attempts to provide the primary suppliers and it should be noted that there are often a number of re-sellers of these products). If further suppliers are known, we would invite these to be supplied to the diocese so that this list can be updated.

### **Estimated price brackets**

Depending on the supplier selected and the type of heater, typical costs are between £300 (simple lower powered wall heater) to £10,000 (well-designed chandelier heater) each. The total project costs will depend on the number of heaters, whether an upgrade to the incoming electrical supply is required and the difficulty of running cables to the heaters. A typical installation within a church usually ranges from £15,000 to £80,000.

### **What permissions are currently needed under the Faculty Jurisdiction Rules?**

The installation of overhead infrared heaters will require a faculty to be obtained.

### **Contact details of Oxford Environment Team for further support and information**

[environment@oxford.anglican.org](mailto:environment@oxford.anglican.org)

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