

ELECTRICAL WORKS IN CHURCHES

Guidance note

from the Diocesan Advisory Committee for the Care of Churches
2016

These are basic guidelines intended for PCCs to make available to specifiers and electrical contractors, to help in the preparation of tenders, specifications and proposals for new electrical installations, alterations, routine maintenance or minor works, to churches in the Diocese of Exeter.

CONTRACTORS

Only full scope approved members of **NICEIC, ECA, or NAPIT** who are registered to carry out work on commercial installations should be employed to carry out new installations, alterations, maintenance, and minor works. Only the highest standard of workmanship should be allowed. Operatives should be skilled tradesmen, who are aware of the historic and architectural importance of the building.

EXISTING ELECTRICAL INSTALLATIONS

The electrical installation should be fully tested and inspected every five years in accordance with BS7671 (IET regulations guidance Note No 3) by a registered NICEIC, ECA or NAPIT contractor. The inspection certificate/report should be held in the church log book.



- **Code 1 defects** - Immediate remedial action required.
- **Code 2 defects** - Urgent remedial action required.
- **Code 3 defects** - Improvement recommended

Installations over five years old should also be subject to annual routine checks.'

NEW INSTALLATION WORK

General

New installations or alterations require a faculty. Minor maintenance or replacement work may be permitted under List B authorisation. All work must be carried out in accordance with BS7671 (IET regulations latest edition including

amendments). It is advisable for the church architect to be involved at an early stage, so that any installation undertaken involves minimal disturbance of the fabric of the building and is aesthetically appropriate.

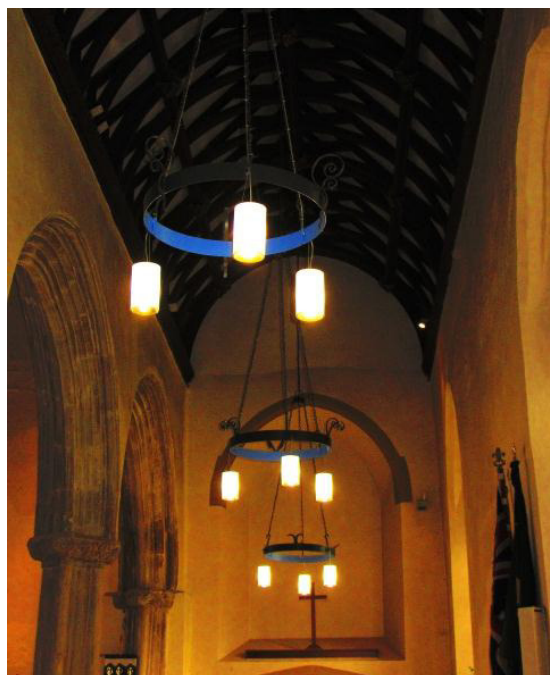
Lighting Installation:

A lighting system should be designed to provide:

1. Sufficient general lighting to enable users of the building to read and follow the Liturgy, as well as move about without health and safety risks.
2. Feature lighting to enhance the architecture.
3. Good flexibility of control to match the activity or mood to the visual environment. It is also essential, when planning an installation, to consider the prospective use of the building, the possible wider community use, and to have efficiency, maintenance, and energy conservation firmly in mind:
4. LED is usually the first choice lighting source because of its efficiency, durability and controllability. The wide available range of LED's with different beam angles mean that one family of fittings can be used for many different purposes.
5. CFL lamps are suited to some enclosed pendant lights.
6. Metal halide discharge lamps could still have a place in providing a wide wash of light in larger churches and for uplighting.
7. The secret of a good lighting system is to be able to control it. Dimmer control can have dramatic effect and save energy. Not all lighting can be dimmer controlled, it is therefore essential to have good flexibility of switching usually with no more than two lamp units per switch. Consideration should also be given to the 'glare factor'; attachment louvers are available for most light fittings.
8. A lighting scheme could include suitable discreet projector spotlights for the activity/concert area. Alternatively this could successfully be achieved by including

appropriately rated power points, for the use of portable stage lighting rigs.

9. Ideally light fittings should be positioned to allow easy access for lamp changing. This is not always possible. Where light fittings are at high level, lamps with very long life span (particularly LED lamps) should be used.



Emergency Lighting:

There is currently no statutory requirement for churches to provide emergency lighting. It is however, the duty of the PCC to carry out a risk assessment, as required under the Health and Safety Regulations.

1. If the assessment results in a decision to provide emergency lighting, it should be installed in accordance with BS5266.
2. An emergency lighting log book, with the record of regular testing must be kept up to date. Without regular testing and maintenance, emergency lighting will soon become ineffective.

3. The emergency light fittings should be non-maintained units (i.e. to activate only on power failure). For aesthetic reasons it would be preferable to incorporate the emergency unit within the primary light fittings where possible, alternatively with LED lighting, as the power consumption is very low, a UPS unit could be included at the mains position to energise selected primary lights in the event of a power failure.
4. If infrequent provision only, is required, illuminated exit signs and emergency lighting can be provided by portable 'plug in' units, with the provision of a discreet socket and bracket in the appropriate positions. When not in use the emergency lighting units could be kept energised, adjacent to the electricity mains supply position. This would also help to ensure that the lighting units are in working order prior to use. It is likely that if churches are planning for wider community use that emergency lighting would be necessary. In any event emergency lighting in the bell ringing chamber and tower staircase is recommended.

External Floodlighting

There are many things to consider before deciding to floodlight the exterior of the church:

1. Light pollution, particularly in rural churches.
2. The Wildlife and Countryside Act (1981).
3. Archaeological advice in respect of sunken lamps and cable routes.
4. Energy consumption - use of low energy fittings - time control to prevent unnecessary illumination.
5. Choice of appropriate lamp colour rendering, for the particular stonework.

ELECTRICAL HEATING

Space heating a church, other than a very small church, by electricity, would not be recommended. The sustained input of heat, required to overcome the heat losses of the building, and raise the temperature to an acceptable level, using electricity, would be substantial, and even if affordable, it would be an extravagant use of energy. The choice of a new heating system will vary according to the circumstances. If the parish is contemplating a wider use of its church, keeping the building constantly warm would be an obvious advantage. Hot water heating systems would be more suited to this. In many churches it is a matter of providing warmth for a small congregation in a large building, for a few services each month, at an affordable running cost. This means putting heat where the people are, rather than attempting to heat the whole space. Electrical heating can be used efficiently to achieve this objective.

Under pew heating

If it is possible for under pew heating to be successfully accommodated, it can be an effective and economical method of providing heat where it is required. The heaters are low level 'skirting type' convector units. They are unobtrusive, and the wiring to them can usually be concealed within the pew platforms. These heaters are available in various lengths and capacity with integral overheat thermal safety cut-out protection, and can be linked together if necessary.

The heaters should be floor mounted on brackets, **NOT** fixed to pews, and assurance should be obtained from the manufacturer that the heaters used in this type of application conform to current Health and Safety Regulations.

Good flexible switching is advisable, ideally a switch concealed under each pew, with contactor/time control at the distribution board to enable the system to be energised for a short pre-heat period prior to the services, and also prevent the heaters

from being left on unnecessarily. If considering such heaters, thought needs to be given to whether there will still be room for kneeling, without any risk to the congregation.

Off/peak fan assisted storage heating

This can be used to provide a low level background temperature in small churches, provided there is space, and they are able to be located relatively unobtrusively. This heating could be used to supplement under pew heating, and would also benefit the fabric.

Radiant / quartz heating

It is generally accepted that quartz heaters are not pleasing in appearance. They also produce a bright light, which can be visually intrusive. These should only be considered where there is no feasible alternative, in which case the installation should be carried out in accordance with the DAC Code of Practice on quartz heating (available from the Church Buildings office).

WIRING SYSTEMS

The following, are the types of wiring considered to be acceptable for use in church buildings:

MICV (mineral insulated copper covered with polymeric sheath)

This is a very durable cable which is available with LSF (low smoke and fume) sheath which comes in various colours to blend with the surrounding surfaces. The brass termination glands are the compression type and come complete with shrouds to match the sheath colour. This cable should be fixed with wrap around clips (colour to match the cable sheath) and screws.

FP200 (fire resistant cable)

This type of cable was first used for fire alarm installations. It is now considered a quality cable suited to many applications. It also has LSF (low smoke and fume) covering. Like MICV cable it retains its shape (good for dressing around stonework). The TRS termination glands prevent the ingress of dampness and also come complete with shrouds. The added advantage of this cable is the economy of installation costs, being far less labour intensive to install than mineral insulated cable. This cable should be fixed with wrap around clips and screws. FP200 cable comes with white covering. However it can be successfully painted to blend with the surrounding surfaces. The paint used must be approved by the cable manufacturers.

MICC (mineral insulated copper covered)

This cable is the same as MICV cable without a sheath covering over the copper. If this cable is used on damp surfaces, particularly with lime based mortar, it will quickly discolour and corrode. This cable should be fixed with wrap-around copper clips and brass screws.

Steel Conduit (with PVC cables)

Steel conduit has been used in many churches in the past and can be re-used for rewiring an installation if found to be in good order with no signs of corrosion. If conduits are re-used the conduit should not be used as a CPC (circuit protective conductor). A separate earth conductor should be used throughout. Where existing conduit is re-used, it does prevent disturbing the fabric. However it is highly unlikely that steel conduit would be considered for a new installation, because of the higher labour cost and the aesthetic impact.

High Impact Plastic Conduit (with PVC cables)

This conduit is much more economical to install. There are applications where this could be preferred, such as towers and boiler rooms.

SWA cable (steel wire armoured)

This cable should be used for all external buried cable runs. It is also ideal for sub-mains, under floors or in ducts. Where this cable is used, the wire sheath should not be relied on as the CPC (circuit protection conductor), a separate earth conductor core should be allowed for.

THE FABRIC

Cable runs should be carefully planned so that they are unobtrusive and do not cause damage or disturb the fabric. Vertical cable runs should be kept to the corners or cross sections, and horizontal runs should be at wall plate level or at low level. Cable fixings should be drilled into the mortar joints (not stonework) wherever possible, and should be appropriately spaced in order that the cables lie flat on the surface. Trunking should only be used for multiples of three or more cables, in which case it should be painted to blend with the surrounding surface.

No chasing of plaster, drilling through walls or exposed timber should be carried out without prior approval of the church architect and the DAC.

SOCKETS AND PORTABLE APPLIANCES

Sockets should be the metal clad type and should be protected by a 30ma RCD. Sockets in wet situations, such as bell chambers, should be at least IP54 rated. All portable appliances should be tested by a competent person in accordance with the Health and Safety regulations, and a log of regular tests for each appliance be provided.



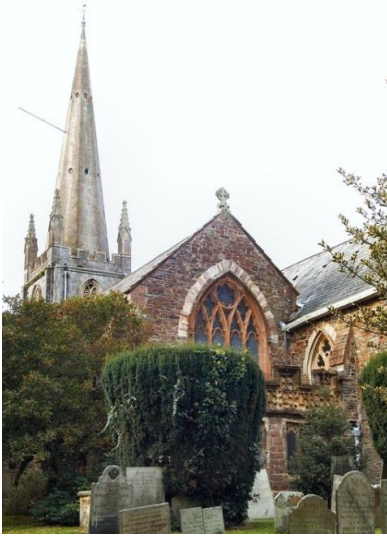
ORGAN

The organ can be a risk area. The electric blower motor is frequently overlooked and is usually tucked away gathering dust. It should be examined at regular intervals to prevent it becoming a potential fire risk, particularly if left inadvertently turned on after the service. It is advisable to have an indicator light on the organ control switch.

LIGHTNING PROTECTION

The majority of churches have a 'tower only' lightning protection system comprising an air conductor, and one down conductor to an earth electrode, which are unlikely to comply with the recommendations of current BS EN 62305.

When a system is upgraded it is usually recommended that a second down conductor is provided on the opposite corner of the tower to a separate earth electrode. Also, where it is not possible by means of separation to reduce the risk of sideflash, the bonding of all metalwork within the separation distance as specified in BS6651 (1999) EN 62305 will be recommended. Similarly, it is a requirement to carry out the equipotential bonding of the lightning conductor to the mains services, such as gas, water and electricity at the main earth terminal. This should be carried out only after consultation with the lightning conductor specialist and a registered NICEIC, ECA or NAPIT contractor, in accordance with BS EN 62305 and BS7671. (Reasons for departure from reg 411.3.1.2 should be noted on the appropriate certificate if not carried out).



Whilst it is not usually a policy condition of the church insurers to have a lightning protection system, it is necessary to keep an existing system well maintained and regularly tested. It is generally considered appropriate to have a visual check by a competent person every twelve months with inspections and testing carried out every two and a half years by a lightning conductor engineer (e.g. a member of the National Federation of Master Steeplejacks and Lightning Conductor Engineers). A record of the visual checks and inspections should be held in the church log book.

SURGE PROTECTION

Surge protection should be considered as part of the risk assessment particularly with the increase in the use of electronic equipment in churches, e.g. sound systems, organ controls, computers, projectors, dimmers etc. Surge protection can be included within the mains distribution gear.

APPLICATIONS

Applications for a faculty for the proposed works should include:

- Design details.
- A clear specification, including quantities and proposed locations of all new equipment and fittings.
- Drawings (both in plan and elevation) and clear photographs showing exact positions of all new fittings. Photos should show where fittings are to be located within the context of the church as a whole.
- Details of cable routes.
- Illustrations of proposed light fittings, heaters, etc. (from catalogue etc.).
- PCCs are advised to obtain two or three quotations to ensure they are getting value for money. Only the quotation from the chosen contractor need be submitted to the DAC. If more than one quotation is submitted to the DAC then it should be stated clearly which the preferred quote is.

CERTIFICATION

The following certificates, appropriate to the works carried out should be provided and held in the church log book:

1. New electrical installation work - NICEIC Electrical installation certificate (EIC)
2. Minor electrical works - NICEIC Minor works certificate (MEW)
3. Periodical Inspection - NICEIC Periodical inspection report (PIR)
4. Portable appliance testing - HSE log test sheet
5. Emergency lighting testing - NICEIC BS5266 log test sheet (ELT)
6. Lightning conductor testing - BS6651 log test sheet



If you have any queries, contact:

Church Buildings Office, The Old Deanery, The Cloisters, Exeter EX1 1HS (01392 294945)
dac@exeter.anglican.org; or consult the diocesan website:

<http://exeter.anglican.org/resources/church-buildings/>