

Guidance note Electrical Wiring Installations in Churches

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Those responsible for the care of a church building need to understand the procedures for the maintenance and testing of electrical systems and equipment, and to consider the impact of any changes on the fabric.

This guidance is intended to provide those concerned with the care of church buildings with a practical guide to safe installation, testing and repair of electrical installations. Technical guidance can be found in other publications such as the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671:2008).

The law and guidance

Places of worship should comply with the Electricity at Work Regulations 1989. Regulation 4(2) provides that *“As may be necessary to prevent danger, all systems shall be maintained so as to prevent, so far as is reasonably practicable,*

such danger.” The definition of ‘system’ includes electrical equipment.

The IET Wiring Regulations are non-statutory. However the Health and Safety Executive may use them to provide evidence of compliance with the Electricity at Work Regulations.

The IET from time to time amend the Regulations. Non-compliance with current regulations does not in itself mean that an installation would fail to comply with the Electricity at Work Regulations. However, it is likely to be reasonably practicable to replace it with equipment

made to a more recent standard only when it becomes unsafe or falls due for replacement, whichever is the sooner.

Parishes will be complying with the Electricity at Work Regulations by having the electrical system and equipment tested regularly.

Periodic Testing and Inspection

In order to demonstrate that your electrical installation is safe it is usual for it to be routinely inspected and tested. The accepted normal period between inspections for churches is 5 years. Therefore a Periodic Test and Inspection Report should be carried out at the





time of the quinquennial inspection. An electrician should be commissioned to do this; see 'Repairs' below for details of how to choose a contractor.

The report may recommend repairs. Work may not be required simply to bring the installation into compliance with the current version of the IET Wiring Regulations. If you are uncertain whether works are required, consult your DAC.

Portable appliances

Portable Appliance Testing (PAT) covers equipment such as cleaners, portable electric heaters, computers, projectors. The frequency of testing depends upon the type of appliance, the location of the equipment and how often it is used. The HSE publication *Maintaining portable electrical equipment in offices and other low-risk environments* www.hse.gov.uk/pubns/indg236.pdf gives further advice. A table of recommended inspection periods for various types of equipment and is reproduced as **Annex A**. Appliances that fail the testing must be removed and either repaired and re-tested or replaced.



Temporary lighting, such as Christmas tree lights, must be tested before being installed.

The inspection of cables to portable equipment can be carried by a member of the congregation. They will be looking for: cuts or abrasions or other damage to the cable covering, cracked casing or bent pins on the plug; loose parts or screws; burn marks; outer covering of the cable not being gripped where it enters the plug or equipment (can the cores of the cables be seen?)

Testing requires equipment, therefore should be carried out by a competent person who is capable of interpreting test results. The HSE guidance says that a PAT need not be carried out by an electrician, but greater knowledge and experience is needed than for the inspection alone. If a church wishes to use an electrician for such work, see 'Repairs' below for details of how to choose a contractor.

Repairs

All repairs, including minor works, must be carried out by a competent electrician, who can be found on the list of Commercial and Industrial Electrical Approved contractors held by the NICEIC, ECA or NAPIT list of contractor members. The electrician must be registered for commercial and industrial work, and not just domestic or Part P work.

As soon as the repairs have been identified, contact the DAC Secretary for guidance on what documentation and approvals are needed.



The location of electrical equipment and wiring runs all needs careful consideration with professional advice

For major wiring schemes, aesthetics and the impact on the building fabric are important issues that will need to be resolved during



the design stage. **Annex B** contains a list of key points for inclusion in wiring contracts.

Choice of Wiring Systems

The traditional cable used in churches was Mineral Insulated Copper Covered (MICC) also known as Mineral Insulated Copper Sheathed (MICS), and commonly known by the trade name 'Pyro'. Light duty bare MICC has the smallest overall diameter for a given load, is capable of being bent to follow the contours of a building, and therefore has the least aesthetic impact on a church. Other enhanced fire performance cables, e.g. FP200, are not direct replacements for MICC: they have greater aesthetic impact being larger and with greater bending radii.

Any wiring system that complies with the IET Wiring Regulations could be suitable for use in a church. However the main criteria to be used when selecting a wiring system must be the potential aesthetic impact and damage to the building fabric impact. Each case must be considered on its merits, but the wiring systems which may be considered are as follows:

Mineral Insulated Copper Sheathed (MICS), or FP200 Gold cables, or equivalent, with the PVC sheath coloured to match its background colour where visible. Bare MICS, ones without the outer PVC sheath, are susceptible to corrosion in damp places.

PVC single cables

contained in steel or rigid heavy gauge high-impact conduit or trunking, where this conduit or trunking can be installed without physical or visual damage to the church building. The conduit or trunking must be painted the same colour as the surface to which it is fixed.

For **outdoor underground wiring, or supplies to distribution boards**, use PVC sheathed Steel Wire Armoured (PVC/SWA/PVC) cables



The choice of cable, colour and wiring runs may have a dramatic effect on the appearance of a church

MICS cables are the smallest, and neatest, but can be more expensive due to the time taken to make off the terminations. FP200, or equivalent, are the next smallest and not as neat as MICS due to the bending radius of the cable, but can be cheaper as the terminations are simpler.

Conduit is larger than single MICS or FP200 cables, but can contain several cables, and is more visually intrusive. Chasing out to bury the conduits can be very invasive and certainly must not be done where there might be wall paintings or historically sensitive fabric. Trunking is large and difficult to make discreet. It is often required near distribution boards or dimmer racks for complex lighting schemes due to the number of cables.

PVC cables must be protected from the risk of physical damage, particularly at low level. They can be easily concealed and are cheap to install.

PVC/SWA/PVC cables are the largest, but are suitable for external work as the wire armouring provides excellent physical protection. They are difficult to conceal within a church.



The DAC Electrical Advisor will be able to advise you on the most appropriate wiring system for your church.

Distribution Boards

Distribution boards provide the means for individual electrical circuits to be installed. They contain one

of the key safety features, namely the fuse or circuit breaker. 'BS 88' fuses are good because they can clear very large fault currents safely and cannot operate again. On the other hand circuit breakers are expected to work safely again after they have cleared large faults, such as short circuits.

Circuit breakers must be capable of safely working at fault currents up to 6kA. Churches should install Residual Current Circuit Breakers, RCCBs, on circuits containing socket outlets for additional protection against electrical shocks.



Annex A

Table of recommended suggested initial intervals for checking portable electrical equipment

From *Maintaining portable electric equipment in low-risk environments*, HSE, April 2012

Suggested initial intervals

Equipment/environment	User checks	Formal visual inspection	Combined inspection and testing
Battery-operated: (less than 40 volts)	No	No	No
Extra low voltage: (less than 50 volts AC), telephone equipment, low-voltage desk lights	No	No	No
Desktop computers, VDU screens	No	Yes, 2–4 years	No if double insulated, otherwise up to 5 years
Photocopiers, fax machines: NOT hand-held. Rarely moved	No	Yes, 2–4 years	No if double insulated, otherwise up to 5 years
Double insulated equipment: NOT hand-held. Moved occasionally, eg fans, table lamps	No	Yes, 2–4 years	No
Double insulated equipment: HAND-HELD, eg some floor cleaners some kitchen equipment	Yes	Yes, 6 months– 1 year	No
Earthed equipment (Class 1): eg electric kettles, some floor cleaners, some kitchen equipment and irons	Yes	Yes, 6 months– 1 year	Yes, 1–2 years
Cables (leads and plugs connected to the above) and mains voltage extension leads and battery-charging equipment	Yes	Yes, 6 months–4 years depending on the type of equipment it is connected to	Yes, 1–5 years depending on the type of equipment it is connected to



Notes:

- Over time, when you look at the results of user checks, visual inspections and, where appropriate, portable appliance tests, you will notice trends. These may tell you that you need to look at or test electrical equipment less (or more) often, depending on the number of problems being found. Some examples of how to do this are shown on our website (www.hse.gov.uk/electricity/faq-portable-appliance-testing.htm)
- If electrical equipment is grouped together for testing at the same time, you should use the shortest testing interval in the group rather than the longest. Alternatively, it may be appropriate to group your electrical equipment by testing interval





Annex B

Key points for inclusion in all electrical wiring contracts

- a) All cables routes must be agreed with the architect/surveyor, submitted to the DAC and included in the faculty petition. Unless they follow the existing route, the electrical contractor must be required to submit drawings for approval showing the proposed routes of all cables and equipment locations. Where this is not practicable, the routes of all cables and equipment locations should be clearly described in writing, and marked up photographs.
- b) Holes or chases must not be made in or through buttresses, piers, mullions, columns, detached shafts or vaulting ribs.
- c) No hole may be drilled in, or fittings fixed on, any bosses – whether stone or wood – unless they have already been drilled for a previous installation.
- d) Beams, structural timbers or mouldings are not to be drilled, notched or sawn on any surface.
- e) No chases shall be made in brickwork, masonry or plaster without express description in the specification and approval of the architect/surveyor.
- f) Wiring must not be laid over the surface of any carvings or paintings nor, if any other line is available, may it be laid over the face of mouldings.
- g) Where woodwork – e.g. pews or panels – must be pierced, care must be taken to drill the smallest and neatest hole that can give reasonable clearance for conduit or cable and to make to in the least conspicuous position.
- h) Proper care should be taken to protect the organ and any other musical instrument. Articles of furniture and works of art liable to damage should either be removed from the area of work or adequately protected.
- i) Where visible, all cables, conduits, trunking, or other cable enclosures must be painted to match the colour of the surface to which they are being attached.
- j) Plugs in walls for conduits, switches, fuseboards, saddles, etc. should be as small as practicable. If the condition of the masonry or plaster is such that any other fixing method appears necessary, then the architect/surveyor must be consulted.
- k) “Hot works” – e.g. soldering connections – must be avoided and other methods employed.
- l) The contract should forbid the use of radios.
- m) Allowance must be made within the contract to minimise, as far as is possible, any interruption to regular church services and unscheduled services such as funerals.

