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Greater Manchester Councils
Local Authority Building Control

Building Regulations Part P Electrical Safety

Winter 2006/07

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The Building Regulations - A Basic Guide to Electrical Safety in Dwellings

Contents

Published by Greater Manchester Building Control.
Produced by APP Publishing Consultants Ltd, Venture House, Cross Street, Macclesfield, Cheshire SK11 7PG.
Tel: (01625) 511645 Fax: (01625) 617043 Email: production@app-publishing.co.uk (SJL/01/07)

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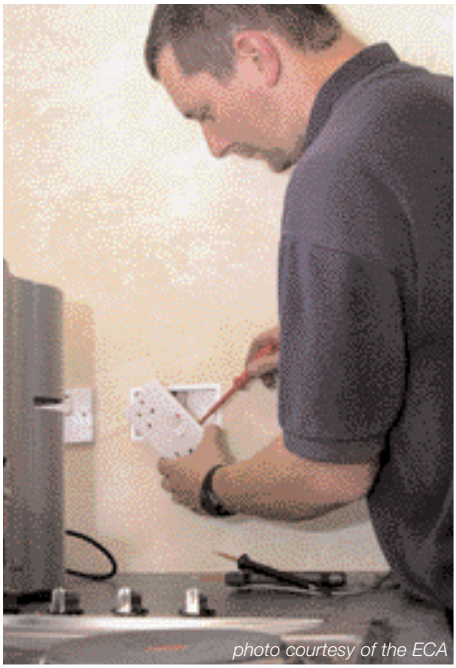
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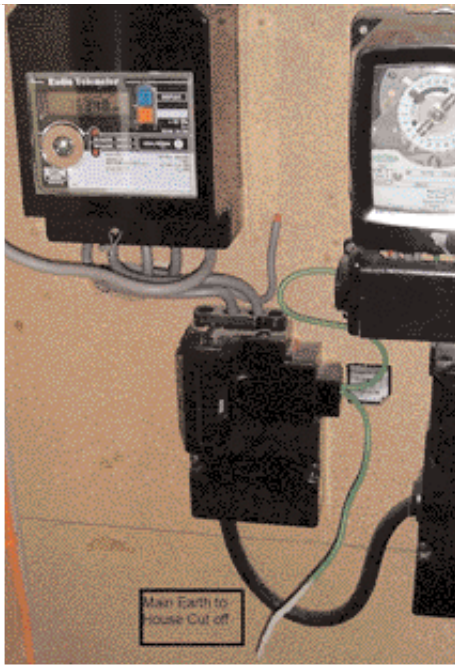


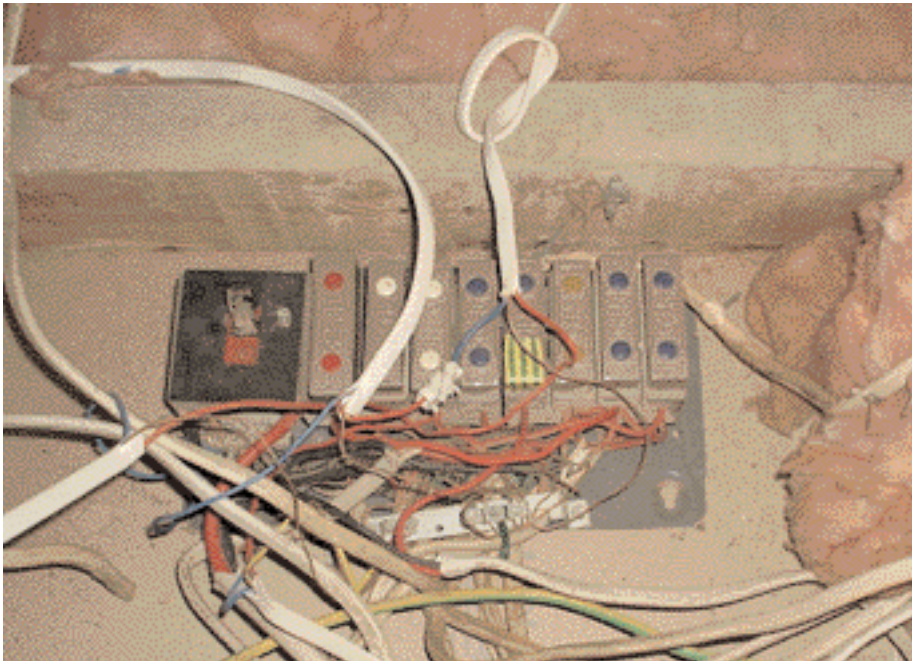

photo courtesy of the ECA

Foreword

The introduction of electrical safety into the Building Regulations has been heralded as the way forward in regulating the industry, hopefully reducing the number of rogue traders, and thereby minimising the risk of injury and fatality.

This booklet has been produced by the ten local building control authorities of Greater Manchester. The ten authorities have worked together, and have agreed to implement the new legislation in a consistent manner.

We hope that you find the information presented in this booklet useful. Should you require clarification, please contact your local authority Building Control Surveyor. The contact numbers are included at the back of this booklet.



Dangerous Electrical Work

Disclaimer

*Please note that the information in this booklet provides only a **basic** guide in relation to the legislation for persons undertaking the installation/alteration of electrics in domestic properties. Therefore, should you require information regarding the in-depth technicalities and requirements of the appropriate legislation, please refer to Approved Document P of the Building Regulations, or the relevant British Standards and IEE Regulations.*

Your local authority cannot be held responsible for any misinterpretation concerning this booklet; additional information or final clarification should be obtained directly from your local authority Building Control office, or your appointed 'Competent Person Scheme' electrician.

What are the Building Regulations, and how do they differ from Planning permission?

The majority of building projects have to comply with minimum requirements known as the Building Regulations. These regulations contain various sections detailing the type of building works that require Building Regulation approval. The Regulations also explain the procedure to obtain approval, and the required technical performance of building work. The regulations exist to help protect the health and safety of people in and around buildings.

In comparison, Planning Permission is primarily concerned with matters of site layout and external design. The Building Regulations are concerned with the actual technical design and construction process for both internal and external alterations to buildings, the Local Authority Building Control Surveyor undertakes site inspections during the progress of the work to assess whether the person responsible for the work is complying with the regulations.

Carrying out electrical work to a dwelling will not require planning permission unless your dwelling is a listed building or in a conservation area. In these situations, you should check with your planning officer.

What is Part P?

Several guidance notes accompany the Building Regulations. These are referred to as the 'Approved Documents'. The documents contain practical guidance on ways to comply with the Building Regulations. Each approved document covers a different aspect of the regulations, for example, Approved Document A covers structural stability, Approved Document B covers fire safety and so forth. These approved documents are more commonly referred to as Part A, Part B and so on.

The Government has created Part P to cover the safety of fixed electrical installation work on domestic premises. It is the first time in England and Wales that the standard of electrical installation work has come under statutory scrutiny.

Regulation P1 of Part P requires that:

- *Reasonable provisions shall be made in the design and installation of electrical installations in order to protect persons operating, maintaining or altering the installations from fire or injury.*

Therefore, some (though not all) electrical alterations will now require Building Regulation approval from your local authority.

Why has Part P been introduced?

Government statistics show that fixed electrical installations in homes in England and Wales cause around 5 deaths and more than 500 injuries every year. A further 25 deaths and 590 injuries are caused by more than 12,500 fires in homes across the country which are reported as having an electrical source of ignition.

What type of property does Part P apply to?

The scope of part P applies to fixed electrical installations in buildings or parts of buildings comprising:

- Dwelling houses and flats;
- Dwellings and business premises that have a common supply – for example, shops and public houses with a flat above;
- Common access areas in blocks of flats such as corridors and staircases (excludes power supplies to lifts);
- Shared amenities to blocks of flats such as laundries and gymnasiums;

Part P also applies to electrical installations in gardens, where the land is associated with any of the above, and where the electricity is located within or shared with a dwelling, e.g. outside lighting and pond pumps in gardens.

Any electrical installations to conservatories and outbuildings such as sheds, detached buildings, detached garages, and greenhouses are also included within the regulations. This means that buildings that would normally be exempt from the Building Regulations must still have any associated electrical work approved where necessary.

Outside Lighting subject to Part P

Part P Electrical Safety in Dwellings

What does the Introduction of Part P actually mean?

Where electrical work is subject to the requirements of Part P, there are two options available:

1. You can have the electrical installation undertaken by an individual or firm who is qualified to self-certify their own work under a 'Competent Persons Scheme' (the preferred route);

   OR

2. Obtain building regulation approval. A charge is payable for a Building Regulation application. The Building Control Surveyor will undertake an inspection at your request before the work is plastered over.

   When electrical work is carried out, the qualified electrician should carry out a test of the installation and provide you with a test certificate. This certificate will have to be submitted to Building Control before a 'Completion Certificate' can be issued by them to confirm satisfactory installation. A Completion Certificate is a very important document that will be needed should you ever sell your house.

What is the Competent Persons Scheme?

This scheme enables electricians to self-certify their own electrical work.
A competent person has demonstrated under the scheme that they have the necessary knowledge, skill and experience of the type of electrical work to be undertaken to enable them to carry out the work in accordance with the Building Regulations. A person qualified to 'self-certify' is a firm or an individual, registered with an electrical self-certification scheme authorised by the Secretary of State. Similar self-certification schemes exist for other work and can be viewed on the government website at www.communities.gov.uk

Members of a 'Competent Person Scheme' that are able to self-certify their own work must have an appreciation of how the Building Regulations in general affect their electrical installation work, and they need to be sufficiently competent to confirm that their work complies with all the applicable requirements of the Building Regulations, not just Part P. (e.g. Part B – work not to detrimentally affect fire safety or Part A – notches in floor joists not to affect the structural integrity of joists etc.)

If electrical work subject to Part P is undertaken by an electrician qualified to self-certify their work under a Competent Persons Scheme, there is no need to submit a Building Regulation application to the local authority, and no site inspections will be necessary by the Building Control Surveyor.

What type of electrical work would require a Building Regulation application to the local authority?

You will need to obtain building regulation approval when you are:

- Providing a new installation or rewiring a dwelling
- Replacing a distribution board or consumer unit
- Creating an additional circuit to an existing mains supply
- Adding additional sockets or switches to kitchens, bathrooms, or 'special locations'.
- Installing extra low voltage lighting, other than pre-assembled C.E. marked lighting sets.
- Making or altering an electric supply to domestic outbuildings, or external locations, or other 'special locations'.

A 'special location' is a location containing a bathtub or shower basin, swimming pools or paddling pools, or hot air saunas.

You will NOT need to submit a building regulation application for:

- Work undertaken by an electrician registered with a Part P Competent Person Scheme.
- Replacing sockets, switches or ceiling roses (even when in a kitchen, bathroom or 'special location'). Providing it does not include the provision of any new fixed cabling.
- Replacing like for like cables for a single circuit only, where damage has occurred e.g. by fire or rodents etc. Replacement cables must have the same current carrying capacity and follow the same route.
- Refixing or replacing the enclosures of existing installation components, where the circuit protective measures are unaffected.
- Providing mechanical protection in existing installation components, where the circuit protective measures and current carrying capacity of conductors are unaffected by the increased thermal insulation.
- Installing or upgrading main or supplementary equipotential bonding. Work must comply with other applicable legislation, e.g. Gas safety (Installation and Use) Regulations.

Work also exempt from a building regulation application, providing it is NOT in a kitchen, 'special location' or is a 'special installation':

- Adding lighting points (light fittings and switches) or socket outlets or fused spurs to an existing circuit. Only if the existing circuit protective device is suitable and protects the modified circuit, and other relevant safety provisions are satisfactory.

'Special Installations' are electric floor or ceiling heating systems, garden lighting or power installations, Solar photovoltaic (PV) power supply systems, small scale generators such as microchip units, extra-low voltage lighting installations, other than pre-assembled, CE-marked lighting sets.

TABLE A - Examples of Electrical Works subject to the requirements of Part P

TYPICAL DOMESTIC LOCATIONS	EXTENSIONS AND MODIFICATIONS TO CIRCUIT	NEW CIRCUITS
Bathrooms	✓	✓
Bedrooms	X	✓
Bedrooms containing a shower or basins	✓	✓
Burglar alarms	X	✓
Ceiling (Overhead) heating	✓	✓
Communal areas of flats	✓	✓
Computer cabling	X	X
Conservatories	X	✓
Dining rooms	X	✓
En-suite bath/shower rooms	✓	✓
Extra low voltage (ELV) non pre-assembled CE marked lights	✓	✓
Garden – lighting	✓	✓
Gardens – power	✓	✓
Greenhouses	✓	✓
Halls	X	✓
Integral garages	X	✓
Kitchens	✓	✓
Kitchen diners/open plan living rooms	✓	✓
Landings	X	✓
Lofts	X	✓
Lounge (see kitchen note)	X	✓
Remote/detached buildings	✓	✓
Remote/detached garages	✓	✓
Saunas	✓	✓
Sheds	✓	✓
Shower rooms	✓	✓
Small scale generators	✓	✓
Solar power systems	✓	✓
Stairways	X	✓
Studies	X	✓
Swimming pools	✓	✓
Telephone cabling	X	X
TV Rooms	X	✓
Under floor heating	✓	✓
Workshops – detached from dwelling	✓	✓

KEY

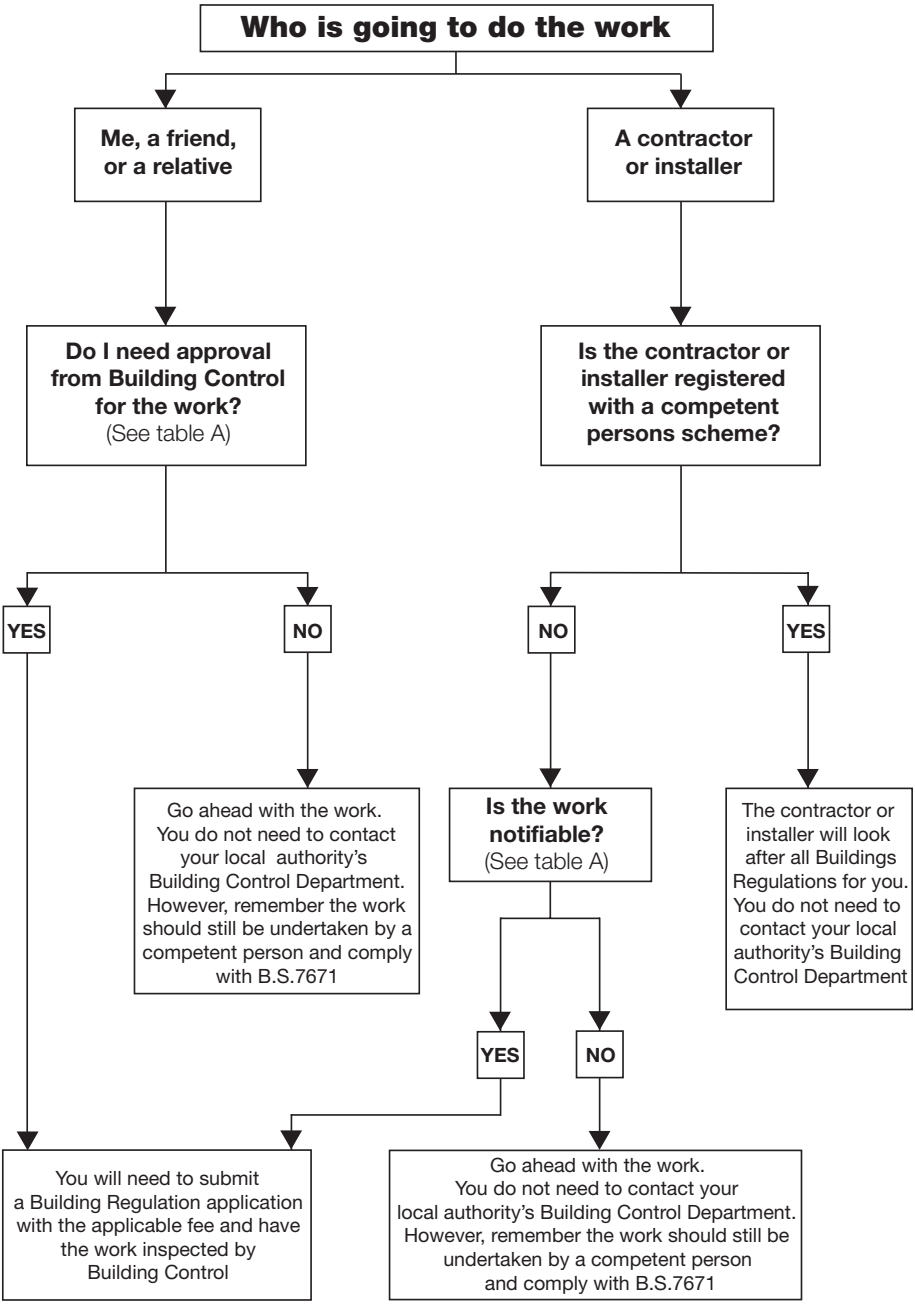
X - *indicates Building Regulation approval not required (not notifiable work)*

✓ - *indicates Building Regulation approval required (notifiable work)*

Electrical work in a bathroom that requires approval

Replacing a light fitting does not require approval

Do You Need to Nofity Building Control



How can I tell if my electrician is qualified to self-certify under a Competent Person Scheme?

If your contractor claims to be a member of the Competent Person Scheme, please obtain evidence to ensure this is the case. Ask for the contact details of their membership body, along with their membership number if necessary.

Your local Yellow Pages also incorporates a section under 'Electrical Contractors' for Part P registered installers.

At the time of publication, the organisations developed to manage the self-certification registers under the Competent Persons scheme are BRE Certification Ltd., British Standards Institute, ELECSA Ltd., NICEIC, NICEIC Certification Services Ltd., and NAPIT.

IMPORTANT: An electrician may be a member of some of the above organisations without being qualified to self-certify their work.

What about electricians who have not become Competent Person Scheme members?

A qualified electrician who is not registered to self-certify under the Competent Person Scheme

For example, these are electrical contractors who are members of the NICEIC or ECA but are not members of the Competent Person Scheme. These contractors cannot self certify their own electrical work, and will need to submit a Building Regulation application. The ten Greater Manchester building control authorities have agreed that they will accept installation certificates and inspection and testing forms without the necessity for additional independent third party testing. This is because they are members of established national organisations that define and audit competency and service quality. Building Control may query the information on the certificates in some cases.

A Building Regulation application will have to be submitted to the local authority, with the relevant fee. The Building Control Surveyor will need to be asked to undertake a visual inspection before the electrics are covered over, and once again upon completion. Providing that everything is in order, you will be issued with a 'Completion Certificate' by the local authority, which you will need when you sell your property.

An electrican who is unable to prove competence

Typically, this may be an electrician who has traded as such for many years, but who has never felt the need to sign up for membership to any recognised body, and is therefore unable to prove their competency.

An application will have to be made to the local authority for approval under the Building Regulations before starting work, together with the appropriate fee. Building Control will undertake an appropriate inspection by request prior to the works being covered over. *You will require another electrician who is qualified to inspect and test electrical work to provide a third party installation/test certificate.* Copies of any appropriate installation and test certificates must be provided to the homeowner, with copies forwarded to Building Control. Providing that everything is in order, you will be issued with a 'Completion Certificate' by the local authority that you will need if you sell your property.

Testing Electrical Work

Do-It-Yourself Installation

The rules do not prevent DIY installation. However, it is strongly recommend that professional advice is obtained from a qualified electrician, preferably a member of a Competent Persons Scheme. Persons undertaking DIY must provide evidence that the work has been carried out in accordance with BS7671. An application will have to be submitted with the applicable fee, together with an appropriate specification. It will be necessary to have the works inspected and tested, by a person qualified to do so. They will provide the appropriate certification, a copy of which must be forwarded to Building Control. Building Control will also undertake an appropriate inspection, by request, prior to the works being covered over and at completion. If the installation and documentation is satisfactory, you will be issued with a 'Completion Certificate' or 'Completion Letter' by the local authority which you will need if you sell your property.

It may be cheaper and quicker to employ a competent person as previously described to undertake the works.

Fraudulent Certification

BS7671 requires that a person installing electrical work or altering an existing installation must test the installation and provide certification to the owner.

A copy of a satisfactory electrical installation and test certificate must be forwarded to Building Control before a Completion Certificate can be issued.

If the local authority suspects that fraudulent certification is being utilised under any circumstances, Trading Standards will be notified.

What will be the role of the Building Control Surveyor?

Building Control Surveyors are not electricians, and are **not** trained as such but are trained to indentify basic faults. They cannot provide specific technical advice in relation to electrical installations, for example, they cannot advise you how to rewire a property.

The role of the Building Control Surveyor is to provide a visual check during the installation to identify obvious signs of incompetence. They are not there to test, but more to ensure that the installer has tested to ensure the work meets reasonable standards. This clearly places the responsibility on the person carrying out the work to ensure that inspection and testing of electrical installations is carried out.

The Surveyors will also ensure that during the course of the electrical installation work, other aspects of the Building Regulations will have been complied with, e.g they will consider the effect that the electrical wiring will have on the structure, fire resistance, accessibility etc.

An inspection should be requested at preplaster stage, and once again upon completion.

The ten Building Control authorities within Greater Manchester (Bolton, Bury, Rochdale, Salford, Manchester, Trafford, Wigan, Stockport, Tameside, Oldham) have all agreed to manage the new requirements in a similar way. However, it is important to note that authorities outside of the Greater Manchester area may administer the system differently.

I'm an agent/architect – what's my role?

You have a responsibility to ensure that your client is aware of the legislation in relation to Part P.

For the majority of applications, the client will not know whether the electrical contractor will be a member of a Competent Person Scheme or not. The building regulation application form requires the applicant to declare whether they intend to use an electrician who is a member of a Competent Person Scheme or not. This is intended to bring this matter to their attention prior to work commencing.

An example of a typical endorsement to be included on your domestic plans may be as follows:

"All electrical work required to meet the requirements of Part P (Electrical Safety) will be designed, installed, inspected and tested by a person competent to do so.

Prior to completion, the local authority must be satisfied that either:-

An electrical installation certificate issued under a Competent Person Scheme has been issued; or;

Appropriate certificates and forms defined in BS7671 (as amended) have been submitted that confirm that the work has been inspected and tested by a competent person. A competent person will have a sound knowledge and experience relevant to the nature of the work undertaken and to the technicial standards set down in BS7671, be fully versed in the inspection and testing procedures contained in the regulations and employ adequate testing equipment."

How will the local authority know whether my work has been undertaken by a 'Competent Person' under the self-certification scheme?

Where an individual or firm is affiliated to a Competent Persons Scheme, they should forward details of satisfactory installations to yourself and their membership body promptly. Their membership body will then forward details of all satisfactory installations to your local authority, and this must be done within 30 days of the installation. Please ensure that your electrician forwards the information to their membership body, otherwise it can leave you open to enforcement action, and it will also cause you problems if you ever want to sell your property.

What is the significance of the 'Completion Certificate' issued by Building Control?

The Completion Certificate is an extremely important document. It is issued by your Building Control division upon satisfactory inspection and completion of the work. You will need this document should you ever sell or re-mortgage your property. Your buyer's solicitor will want evidence that the work was completed to the satisfaction of Building Control, or that the work was undertaken by an electrician under 'The Competent Person' scheme.

Please note that where your electrics form part of a larger building regulation application (e.g. a kitchen extension), the completion certificate will not be issued until there is satisfactory completion of **ALL** works.

Application forms and charges

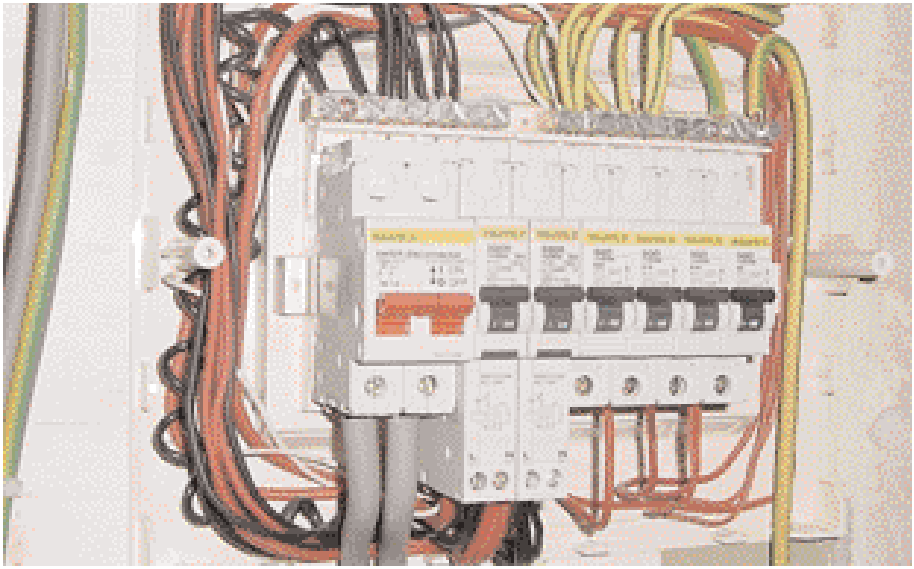
If you are not using an electrician registered under a Competent Person Scheme and you are submitting a building regulation application then an application form and the correct fee must be submitted to your local authority Building Control before the work starts.

Should you require detailed information regarding the forms and scale of fees, please contact your local authority direct. There are three scenarios:

1. **Where electrical work is forming part of other work requiring a Building Regulation application:** An additional question regarding electrical installations has been incorporated into the two main types of Building Regulation forms (the Building Notice and Full Plans forms). There will be no additional fee for the electrical work, as it is likely that the work will be visually checked at the same time as the other works.
2. **Where work is being undertaken separately from other work requiring a Building Regulation application:** e.g. where a kitchen extension is being built, but the house is being rewired at the same time. Again, the Full Plans or Building Notice application forms must be used. An additional fee will be required for the electrical works. The fee is based on the charges for 'Other Works'.
3. **Where only electrical adaptations are taking place:** There is a new application form specifically for electrical works. The fee will be based on the current 'Other Works' fee schedule.

Enforcement

Failure to comply with the Building Regulations is a criminal offence and local authorities have the power to require the removal or alteration of completed work that does not comply with these requirements. The person carrying out electrical work that contravenes the Building Regulations can be fined up to £5,000 per contravention, and £50 each day the contravention continues.



Consumer Unit exposed showing essential circuit breaking devices.

Frequently Asked Questions when not using an electrician registered with a Competent Person Scheme

Do I need approval to replace a consumer unit?
Answer: Yes, if you are providing a fixed electrical installation.

I am intending to build an exempt conservatory, shed, greenhouse, detached garage/building or carport, do the electrical regulations apply? And what is the implication on the Building Regulation exemption?
Answer: If you intend to provide electrical installations to any building usually exempt under the Building Regulations, and the electricity is received from a source shared with or located inside a dwelling, then a Building Regulations application is required for the electrical work, even if an application is not required to actually build the structure itself.

I am intending to do a rewire; does this require Building Regulation approval?
Answer: Yes, if you are providing a fixed electrical installation.

I am intending to provide external lighting/garden lighting, does this require Building Regulation approval?
Answer: Yes, if you are providing a fixed installation.

I am intending to install a garden pond with an electric pump; does this require Building Regulation approval?
Answer: Yes, if you are providing a fixed electrical installation.

Is minor electrical work in a utility room notifiable?
Answer: No. The definition of a kitchen does not include a utility room. Minor work in utility rooms (such as adding socket outlets and lighting points to existing circuits) therefore need not be notified to building control.

I am intending to install new lighting or an electrical fan/additional lighting to my bathroom/en-suite/shower room; does this require Building Regulation approval?
Answer: Yes.

I am intending to provide additional lighting and sockets in my kitchen; does this require Building Regulation approval?
Answer: Yes. However, you will not require approval if you are simply replacing existing sockets, switches or ceiling roses.

Does the connection of a new cooker, or the replacement of a cooker require approval?
Answer: No, unless the work includes the provision of a new circuit.

Does the installation of the power and control wiring for a new central heating system require a building application?
Answer: Yes, even if electrical work in kitchens and bathrooms can be avoided.

Can I do my own electrics?
Answer: The regulations do not prevent this, but you are strongly advised before you decide on this route to take professional advice from a qualified electrician, preferably a member of a **Competent Persons Scheme** (see page 7).

Persons undertaking DIY must provide proof that work will be carried out in accordance with British Standard 7671/IEE guidance, and will have to have the works inspected and tested in accordance with BS7671 by a competent electrician. Therefore:-

- You will have to apply for a Building Regulations application and arrange for third party inspection and testing of the works.
- Any defective work found will have to be corrected as required at your own expense.

It may be cheaper and quicker to employ a competent person (see page 7).

How can I find an electrician approved under the Competent Person Scheme?
Answer: Either look in the Yellow Pages under 'Electrical Contractors' where a range of 'Part P' electricians are listed, or refer to the Contacts page of this booklet and contact one of the membership bodies listed. If you find an electrician who claims to be a Part P installer, registered with a Competent Persons Scheme, ask to check their credentials.

My electrician is a member of the NICEIC or ECA. Does this mean that I don't have to make a building regulations application?
Answer: Not necessarily, the electrician must be a member of The NICEIC or ECA and their 'Competent Person Self-Certification Scheme' (CPS). Employing a 'Competent Person' under a self-certification scheme means you do not have to submit a Building Regulation application for electrical work.

What happens if my electrical contractor is not a member of a Competent Person Scheme?
Answer: It will be necessary to submit a Building Regulation application for the electrical works and you will need to notify Building Control prior to covering up of any cables to allow the Building Control Surveyor the opportunity to carry out an inspection. Your competent electrician must also undertake sufficient installation inspections (prior to covering of wires, etc) and completion testing in accordance with BS 7671. Any defective work found upon inspection by the Building Control Surveyor will have to be corrected.

A copy of the installers BS 7671 Installation Certificate (which is required in all cases) and a 'competent electricians', Electrical Installation Test Certificate compliant with BS 7671 must be provided to the client and Local Authority.

What inspections will the council make?
Answer: Where other building work is being carried out subject to a building regulation application (for example, a kitchen extension) our normal inspection process will apply, and the electrics will be checked at pre-plaster stage.
For electrical work only, you or your contractor must notify the Building Control Surveyor at commencement, pre-plaster and completion of work.

What certificate do you need from my electrician?
Answer: Where the works have been undertaken by a member of a Competent Persons Scheme, the certification will be forwarded directly to Building Control from their membership body. You should also receive a copy of the test certificates from your installer, and must keep them safe.

Where the electrician isn't a member of a Competent Person Scheme, an installation/test certificate must be issued by somebody who is qualified and capable of doing so (not necessarily a member of a Competent Person Scheme), with all of the relevant sections completed, including test results. A copy of this should be kept by yourself and a copy must also be sent to Building Control.

Are the electrical certificates the same as the Completion Certificate?
Answer: No. The electrical certificates are issued by an electrician qualified to do so. The Completion Certificate is issued by the local authority once they are satisfied that the works comply with the Building Regulations. You will need the Completion Certificate if you sell your property – keep it safe!

Where can I find a copy of Part P?
Answer: You can dowload a copy from www.communities.gov.uk.

Electrical work in Bathrooms. High risk of electrocution if not installed correctly

Contacts

Local Authority Building Control (Greater Manchester)

Bury	0161 253 5314	E-Mail: building.control@bury.gov.uk
Bolton	01204 336033	E-Mail: building.control@bolton.gov.uk
Manchester	0161 234 4490	E-Mail: building.control@manchester.gov.uk
Oldham	0161 911 4122	E-Mail: building.control@oldham.gov.uk
Rochdale	01706 924327	E-Mail: building.control@rochdale.gov.uk
Salford	0161 779 4985	E-Mail: building.control@salford.gov.uk
Stockport	0161 474 3658	E-Mail: building.bc@stockport.gov.uk
Tameside	0161 342 2637/2638	E-Mail: building.control@tameside.gov.uk
Trafford	0161 912 5870/5871	E-Mail: building.control@trafford.gov.uk
Wigan	01942 404227	E-Mail: planning@wiganmbc.gov.uk

Competent Person Scheme Organisations

NICEIC Certification Services Ltd.
Tel: 0870 013 0391/0800 013 0900
www.niceic.org.uk
Email: enquiries@dis.niceic.org.uk

Electrical Contractors Association (ECA)
Tel: 020 7313 4800
Fax: 020 7221 7344
www.eca.co.uk
Email: electricalcontractors@eca.co.uk

ELECSA Ltd.
Tel: 0870 749 0080
Fax: 0870 749 0085
www.elecsa.org.uk
Email: enquiries@elecsa.org.uk

NAPIT Certification Ltd.
Tel: 0870 4441392
Fax: 0870 4441427
www.napit.org.uk
Email: info@napit.org.uk

BRE Certification Ltd.
Tel: 01923 664100
Fax: 01923 664603
www.brecertification.co.uk
Email: enquiries@brecertification.co.uk

British Standards Institution
01442 278607
www.kitemarktoday.com

CORGI Services Ltd.
(For where electrical installation is undertaken in connection with gas installations by CORGI approved installers)
0870 401 2200
www.corgi-gas-safety.com

OFTEC Ltd
(For where electrical installation is undertaken in connection with the installation of oil-fired combustion appliances by OFTEC approved installers)
0845 658 5080
www.oftec.org.uk

Other Useful Contacts/websites

Communities and Local Government: ***www.communities.gov.uk***
General guidance regarding Part P, and Part P itself can be downloaded, free of charge.
Part P web site: ***www.partp.co.uk***
Institution of Electrical Engineers (IEE): ***www.iee.org***

Useful Documents

The Wiring Regulations BS 7671: 2001 and amendments (ISBN 0-86341-373-O) can be obtained from the Institution of Electrical Engineers, PO Box 96, Stevenage, Herts, SG1 2SD (email sales@iee.org.uk) or the British Standards Institution, Customer Services, 389 Chiswick High Road, London, W4 4AL (email cservice@bsi-global.com)

FEATURES OF A SAFE INSTALLATION

The following information highlights some of the key features of safe installations. It is not an exhaustive list and serves only to indicate some of the items that Building Control Officers may take notice of when viewing electrical work during their inspection visits.

Cables

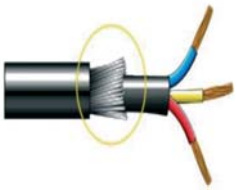
Generally, 1 sq mm electrical cables are suitable for lighting circuits in dwellings. However, for additional mechanical strength and long routes 1.5 sq mm is commonly used.

Socket-outlet circuits are commonly wired as a ring using 2.5 sq mm electrical cables. “Spurred” cables where a cable is linked to the ring main may supply only one additional outlet (e.g. a dual socket). This type of circuit is protected against overload by a 30/32 amp fuse or circuit breaker.

4.0 sq mm and 6.0 sq mm electrical cables are generally used for cooker and shower circuits, although 10.0 sq mm may be required for fittings that require more power (over 8Kw).

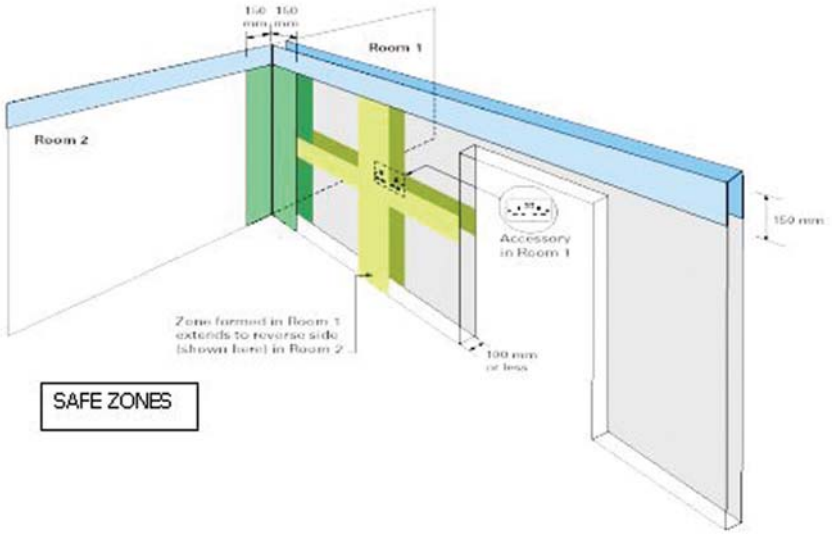
Underground Supplies

A cable that will be buried directly in the ground should, in many instances, be a steel wire armoured (SWA) cable complying with an appropriate British Standard. Alternatively a standard cable enclosed in ceramic or plastic ducting/pipework for mechanical protection can be used. Cables should be buried at a suitable depth (app 300mm) to prevent disturbance or damage from gardening etc.

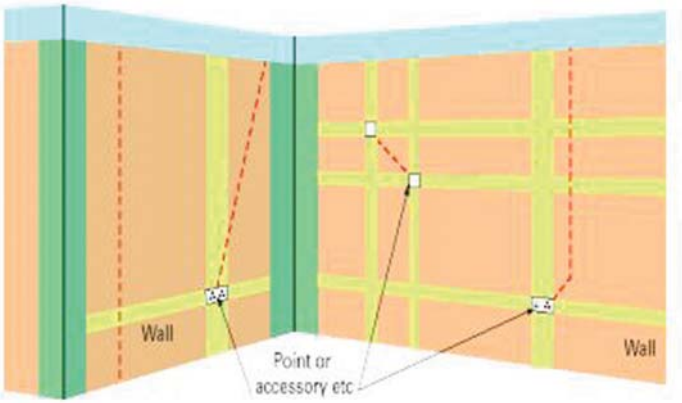


Routing of Cables in Walls

Cables should be routed in 'safe zones' horizontally or vertically from fittings or close to corners or at ceiling level. Cables should not run diagonally or outside these zones.



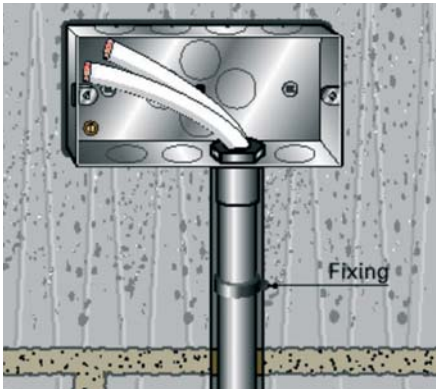
SAFE ZONES



EXAMPLES OF CABLE RUNS NOT IN SAFE ZONES, INDICATED AS ----------

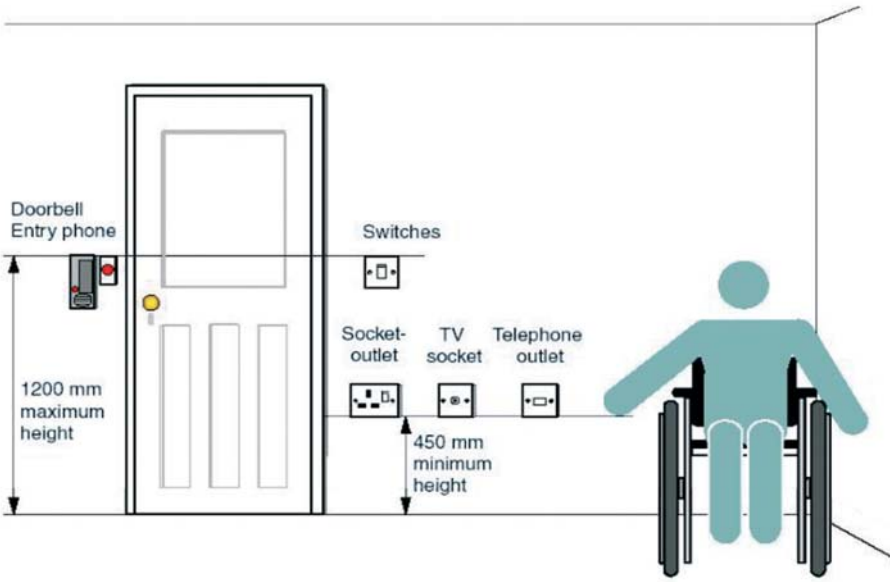
Requirements for Cables Against Mechanical Damage

Cables attached to walls that will subsequently be plastered may need to be protected against possible damage by the plasterer's trowel and will normally be covered for protection.



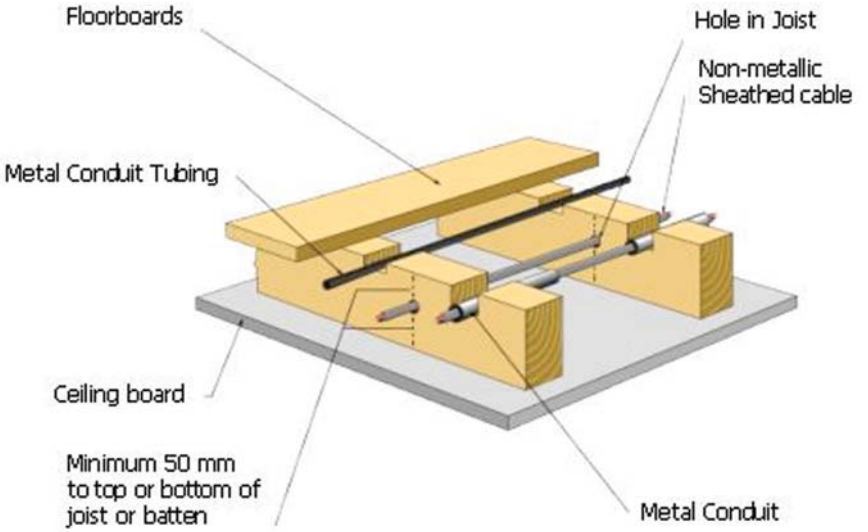
Heights of Sockets and Switches for Accessibility

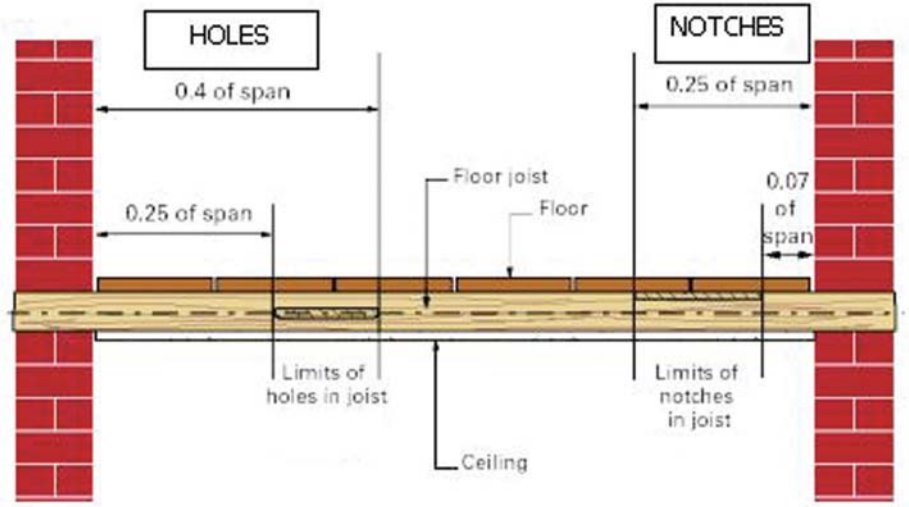
Building Regulations require switches and sockets in dwellings to be positioned at heights convenient for disabled people to use as shown below.



Routing of Cables Through or Over Floor Joists (Safe Zones)

Particular care is needed when running cables through timber floor joists to ensure that firstly, anyone nailing coverings to the floor is not at risk of puncturing a live cable and secondly, that joists are not cut or drilled in positions that may make the floor weak or unstable.





Section through floor

Zones in Bathrooms and Shower Rooms

Bathrooms and shower rooms are considered as high-risk areas because of the presence of water. There is an increased danger of electric shock because water is an excellent conductor of electricity. Therefore, some types of fitting are not allowed and others must have special protection measures.

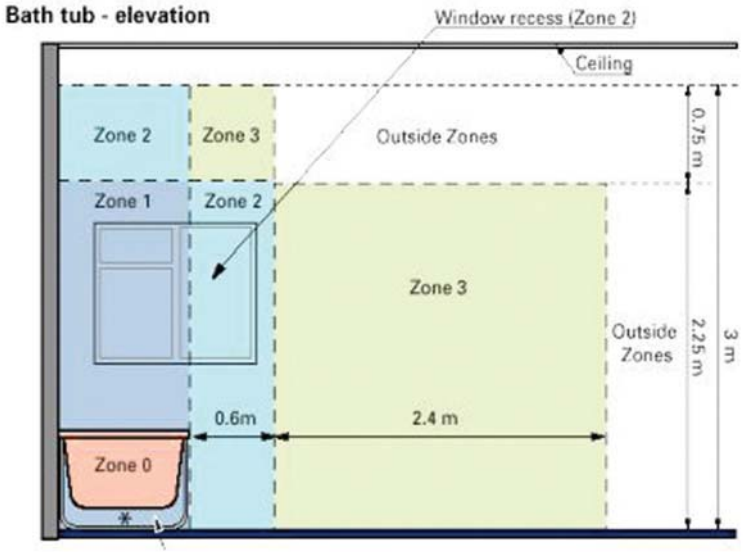
Classification of the Four Zones for Domestic Installations

Zone 0	No sockets switches or accessories including SELV (Separated extra-low voltage) circuits
Zone 1	Only switches for SELV circuits (12volt ac, 30volt dc max)
Zone 2	Switches or sockets for SELV and shaver socket to BSEN60742
Zone 3	All above and switch fuse outlets for heaters etc.

* No socket outlets are allowed anywhere within a bathroom.

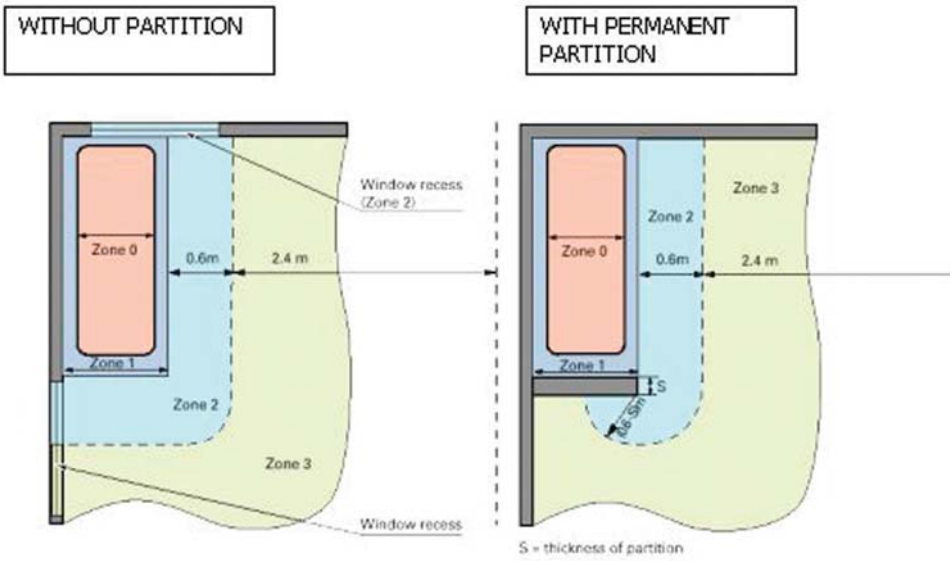
The zones are determined taking account of walls, doors, fixed partitions, Ceilings and floors, where these effectively limit the extent of a zone.

* Lighting or shower pullcords mounted on the ceiling are deemed to be outside the zones of protection.



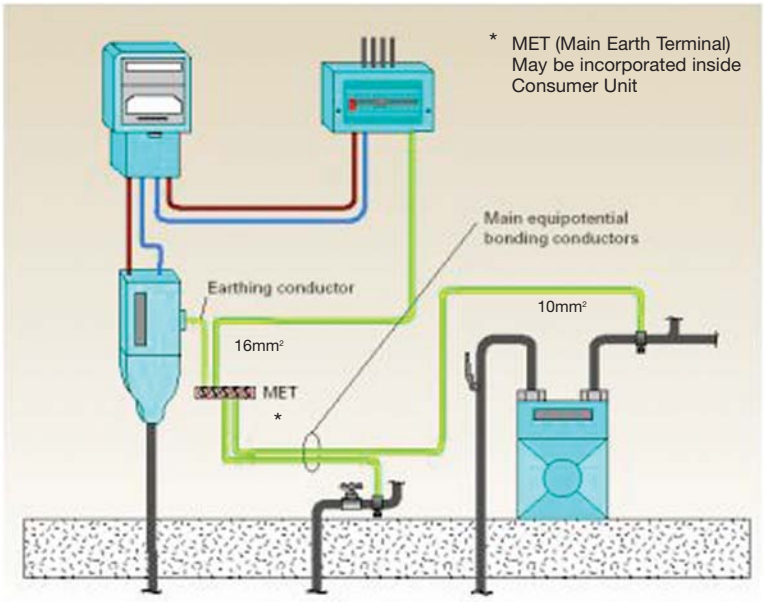
Space under the bath needing a tool to gain access is classed as outside all of the zones of protection. For example therefore controls and switches can be installed for special fittings such as a Jacuzzi .

Bath Tub (plan)



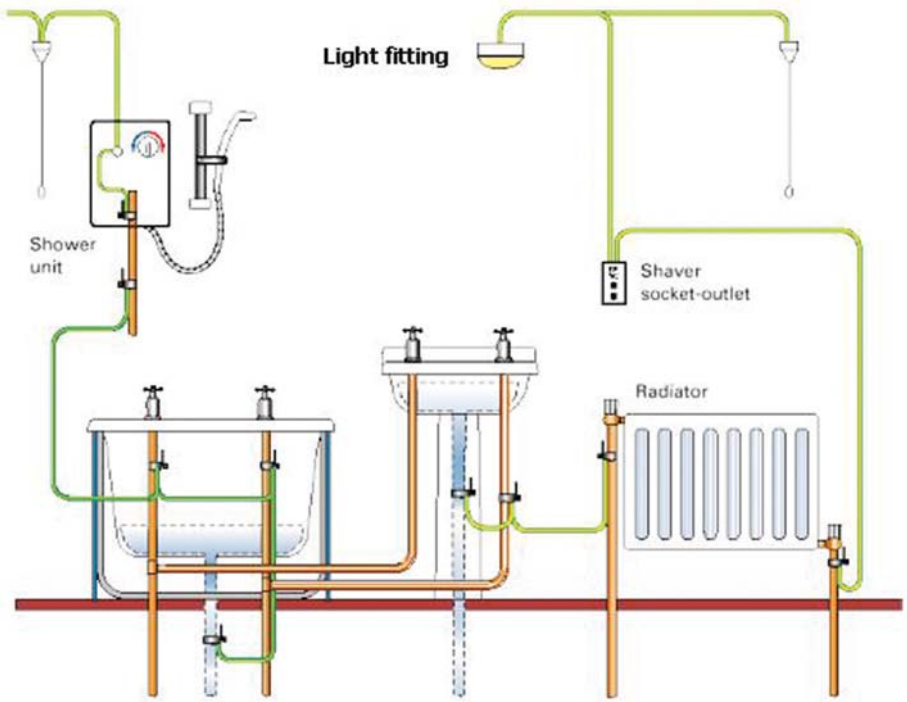
Main Bonding Conductors

The diagram below shows how a typical earth conductor could be connected to the supply, consumer unit and service pipes.



Supplementary Bonding

This diagram below shows how bathroom pipe work is connected together with earth wire. This is necessary to prevent a voltage difference between fittings that may cause an electric shock if a fault occurs.



Bonding is only required to metal waste pipes