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Electrical testing and inspection services

The Electricity at Work Regulations (EaWR) states that “all electrical systems should be maintained so as to prevent danger.”

We offer a variety of solutions in support of our core inspections.

How can we help?

We've developed a suite of electrical services to enhance the safety and integrity of electrical installations and equipment:

- Fixed Wiring: inspection and testing
- Fixed Wiring: routine checks
- Inspections in hazardous areas
- In-service inspection and testing of electrical equipment (formerly known as Portable Appliance Testing)

- Emergency Lighting Inspections
- Thermal Imaging Surveys
- Lightning Protection Systems
- Petroleum Dispensing inspection and testing.

Legal Requirements and Duties

The Health and Safety at Work Act 1974 states that an employer has a 'duty of care' to ensure that their employees (and others affected by their work) are safe.

As an electrical installation gets older and unless it's well looked after and maintained in a safe condition, it will deteriorate. This can lead to fires, injury or even death through electric shock or burns.

Fixed Wiring: Inspection and Testing of Installations

What is the objective of the inspection and test?

To ascertain compliance with the latest edition of BS7671 (also known as the IET (The Institution of Engineering & Technology) Wiring Regulations and the Electricity at Work Regulations and to verify that the installation is in a safe condition and is being properly maintained.

What does the work include?

The Inspection and Test will be carried out in accordance with BS7671 and the IET Guidance Notes that support it. There are essentially three elements to the work:

- Inspection
- Test
- Report.

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Inspection

Comprising of a visual inspection of the electrical fixed wiring installation, an external visual inspection will not require the electrical supply to be isolated. This inspection will establish the general condition of the installation, its security, suitability for purpose, the environment, and the presence of adequate and appropriate protection, fire barriers, lighting and warning notices.

This will be followed by an internal visual inspection of selected elements of the installation (typically this would be those distribution points containing overcurrent protection devices). This will require isolation of the electrical supply. This inspection will establish the integrity of insulation and conductors, security of components, earthing arrangements, correct operation of switches and isolators and appropriate selection of overcurrent devices.

Test

Following completion of the inspection, appropriate tests will be carried out. These tests would normally comprise of earth continuity, insulation resistance, polarity, earth fault loop impedance, functional tests of RCDs and operation of overcurrent circuit breakers, isolators and switching devices.

Extent of Inspection and Test

We're able to offer three different options, all of which are compliant with the regulations:

- **Full Periodic Inspection and Test** - we'll inspect all of the electrical installation's accessible parts and to test all sub-mains and final circuits, subject to agreed client limitations which shall be stated on the report of inspection and test.

- **Periodic Inspection and Test** - We will undertake to inspect all of the electrical installation's accessible parts and to test all sub-mains and then either 20% or 33% of final circuits, dependent on property type. This would be subject to agreed client limitations which will be stated in the report of inspection and test.
- **Annual Periodic Inspection and Test** - for large commercial properties we're able to offer an annual 'rolling' programme over a period of up to 5 years subject to property type. For this option the electrical installation is divided into equal parts (sub sections) and every year we undertake a periodic inspection and test of one of the subsections, ensuring the whole installation will have been completed within the agreed period.

Periodicity

This is determined by a risk assessment in conjunction with the recommended periodicity stated within the IET Guidance Note 3.

For example:

- **5 years** - commercial premises such as schools, offices, shops, restaurants, hotels, public houses
- **3 years** - Industrial locations, leisure complexes, theatres
- **1 year** - Caravan parks, marinas, swimming pools, launderettes.

Report

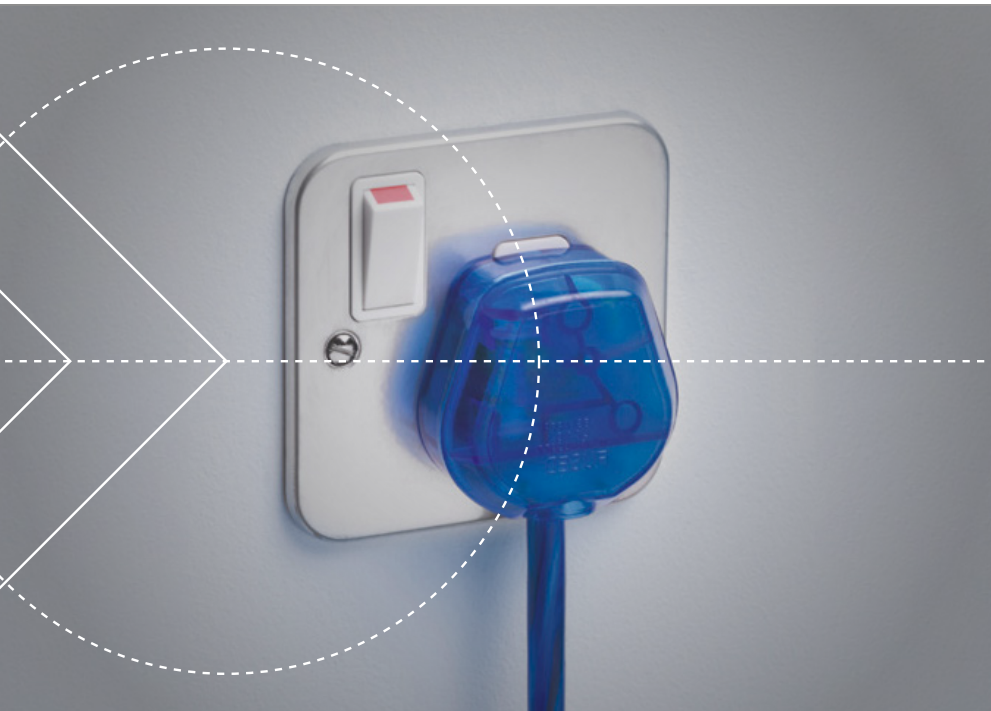
On completion a report will be produced identifying the installation details, the inspection and test schedule, any observations regarding the condition of the installation and the results of all tests carried out.

Limitations

Every effort will be made for the inspection and test to be completed in its entirety. Certain elements may be restricted due to either agreed or imposed limitations. These limitations will be detailed in the final report.



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Fixed Wiring: Routine checks of installations

Electrical installations shouldn't be left without any attention for the period between the periodic inspection and testing.

In commercial and industrial installations, formal arrangements are required for maintenance and interim routine checks, the frequency will depend on the nature of the premises and should be set by the electrical duty holder.

We're able to offer an **Electrical Appraisal Service** where we'll carry out a visual assessment of the electrical fixed wiring and electrical distribution systems. This will not involve any isolation of the electrical supply and therefore no disruption other than access is caused to normal business. We'll produce a written report of the

appraisal which will identify, by priority of noted visual defects, the overall assessment and condition of the installed electrical systems.

Electrical Installations at Hazardous sites

Dangerous substances can put people's safety at risk from fire and explosion.

The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR 2002) put responsibility on the duty holder (employers/self-employed) to protect people from risks to their safety from fires, explosions and similar events in the workplace. This also includes members of the public who may be put at risk by work activity.

Examples of dangerous substances include petrol, liquefied petroleum gas (LPG), paints, varnishes, alcohol

distillation plants and certain types of dust produced in, for example, machining and sanding operations within industries dealing with coal, wood, grain, flour, sugar etc.

The regulations require the duty holder to make an assessment of the hazardous areas and classify such areas into zones.

Following the completion of the above, the duty holder should ensure that the selection of electrical apparatus is suitable and safe for the associated zone in which it is to be operated. In addition, they should put in place initial and periodic inspections for electrical equipment to confirm that the installations are being maintained in a satisfactory condition.

We work with other companies to provide solutions for a comprehensive range of DSEAR Services, which include:

- **DSEAR Site Audit** - providing a formal step-by-step assessment of the existing installation, its procedures and policies
- **Area Classification and Risk Assessment** - includes zoning, classification, report and calculations together with the relevant risk assessment
- **Inspection of Electrical Equipment** - Visual, Close and Detailed periodic electrical inspections carried out in accordance with BS EN60079 part 17
- **Inspection of Non-Electrical Equipment** - a retrospective risk assessment of equipment for compliance with the ATEX* Directive. ATEX is the name commonly given to the two European Directives for controlling explosive atmospheres.

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- **Static Earthing Compliance Audits** - site survey and equipment audit of installation against the Code of Practice for the avoidance of hazards due to static electricity - PD CLC/TR 60079-32-1:2015
- **Explosion Protection Document** - completion of the Explosion Protection Document (EPD) to achieve compliance with Article 8 of the ATEX* Directive 137
- **Safety Management Services** - includes managing non-conformances, implementing design and installation modifications, hazardous area training for employees and provision of an online compliance management tool.

The regulations require the duty holder to make an assessment of the hazardous areas and classify such areas into zones.

In-service inspection and test of electrical equipment (previously known as Portable Appliance Testing (PAT))

The Provision and Use of Work Equipment Regulations 1998 (1999 in Northern Ireland) PUWER state that it is a requirement for work equipment to be inspected by a person competent to do so.

Portable appliances include any electrically energised equipment that's utilising a plug top for connection to a power supply.

This includes:

- **110V** - for example, powered tools and temporary outside lighting
- **230V** - for example, the majority of all electrical equipment in the home and office
- **400V** - for example, heavy duty equipment such as welding machines.

The inspection and test will be carried out in accordance with the guidance provided in the IET Code of Practice for "In-service Inspection and Testing of Electrical Equipment".

The inspection includes a thorough visual inspection of the item of electrical equipment which will establish the general condition and integrity of the equipment, i.e. that it's free from any apparent mechanical defect or damage and that the correctly rated fuse is fitted.

Following completion of the inspection, appropriate tests will be carried out which normally

comprise of continuity testing, insulation resistance testing and a functional test to determine correct operation of the equipment. Detachable electrical supply cords (known as an IEC lead) associated with an item of electrical equipment will be considered as a separate item.

We will also complete the following identified minor repairs (to an appliance with a plug top constructed to BS1363 (domestic, square, 3 pin)):

- Replacement of non-conforming or damaged plug tops
- Replacement of incorrectly rated fuses in accordance with appliance rating
- Re-termination of broken or damaged flex where feasible and safe
- Re-termination of plug top where conductor insulation is visible.

The recommended periodicity depends on the type and use of equipment. In the absence of the user's own risk assessment we will inspect and test on a 12 monthly basis.

* www.hse.gov.uk/fireandexplosion/atex.htm



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Emergency Lighting

To comply with the Fire Precautions (workplace) Regulations 1997, employers need to ensure Emergency Lighting is provided in all premises where people are employed. It should be designed to come on if power is lost to the premises and be sufficient to indicate to the occupants a means for escape, providing illumination along such routes to allow safe progress through escape routes and exits provided.

Emergency Lighting systems automatically operate for between one and three hours on a battery back-up system. They need to be regularly checked and tested to ensure they work efficiently.

This involves the periodic test and inspection of all the main components within the system and includes a functionality test of the key switches, batteries, luminaries and control equipment.

The Emergency Lighting British Standard BS5266 defines the requirements for continued checks and the periodic inspection and tests.

We're able to provide the periodic inspections for Emergency Lighting installations in accordance with this British Standard and provide a detailed report of our findings.

Thermal Imaging Surveys

Thermal Imaging, or thermography as it is often called, is the process of using a specialist camera designed to look only for heat by way of infrared (IR) energy waves. From these 'heat' pictures temperature measurements can be made and therefore any hot spots in the electrical system will show up as red on the image.

Such hot spots are often invisible to the naked eye and can be due to loose electrical connections, load imbalances, corrosion and increase in impedance current. The 'heat' pictures will enable the severity of the problem to be identified and by detecting such anomalies you may be able to organise corrective action to be taken before system failures occur.

Used in conjunction with the BS7671 fixed wiring inspection and testing examination this service delivers the most comprehensive insight into the condition of an electrical installation.



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Lightning Protection Systems

These systems provide for the safety of persons, property and livestock in the event of a direct or indirect lightning strike to structures. They ensure that there is a continuation of essential and/or non-essential services during lightning storms when used in conjunction with suitable surge protection systems.

Following the initial inspection when the Lightning Protection System is installed, periodic inspections should be undertaken at intervals determined by the nature and

structure of the building being protected as specified in BSEN 62305. In most instances these will be annual.

We're pleased to offer periodic inspections in accordance with the requirements of BSEN 62305. This will include the inspection of all accessible parts to ensure they are not visibly damaged or mechanically defective, continuity testing between earth rods of the same system (if applicable), and earth rod measurements. The testing doesn't require electrical isolation in any form and therefore will not cause disruption to electrical supplies.

Fire Alarm Testing

Over time fire alarms start to deteriorate collecting dirt and losing battery, therefore regular testing is essential to ensure they are functioning as they should.

We can provide periodic inspections of automatic fire detection and alarm systems in accordance with BS 5839 and the Regulatory Reform (Fire Safety) Order 2005. We'll check break glass units and smoke and heat detectors will be tested for functionality. Bells and sounders will be operated and assessed to ensure that they provide sufficient sound levels in all areas. Fire panels, their batteries and cable joints where accessible will be checked for integrity and functionality.

When backed up by regular user checks this should ensure that the system is always protecting people and property.



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To help you identify your final circuits at your installation, we have produced the following guidance:

Typically an installation will comprise of 2 types of circuit:

A distribution circuit is one from the main source of energy (e.g. Primary Distribution Board) to a secondary source of energy (e.g. Secondary Distribution Board) and any interconnecting conductors (e.g. Electrical Cable).



Electrical Cable

Primary Distribution Board

A final circuit is one from the secondary source of energy (e.g. Secondary Distribution Board or control panel) to a load (e.g. motor) and any interconnecting conductors (e.g. electrical cable).



Secondary Distribution Board



Load (e.g. motor)



Load (e.g. light)

In a domestic situation a final circuit may look like this:



Individual Circuits
(12 off)

Secondary Distribution
Board (e.g. Consumer Unit)

All you need to do is to add up the number of circuit breakers (switches) or fuses on the Secondary Distribution Boards.

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To find out how much our services cost, couldn't be easier.

If you have any previous reports they are always helpful, but as a minimum all you need to tell us is:

- 01.** Your name, address and contact details (including email).
- 02.** What type of business it is and the location address(es).
- 03.** The final piece of information is dependent on the service:
 - a.** Fixed wiring/thermal imaging - the number of final circuits (ideally per each distribution board)
 - b.** PAT - the number of items
 - c.** Emergency Lighting - the number of lighting points
 - d.** Lightning Protection - the number of rods
 - e.** Fire Alarms - the number of alarms
 - f.** Hazardous Areas - the number of items as specified by the equipment inventory
 - g.** Petroleum Dispensing - the number of pumps.



For further information

To discuss how we can help you with your engineering needs, please contact:

Tel: 0345 076 0146

Email: special.services@allianz.co.uk