

**Protek UK**  
Engineering Consultants

بروتيك  
الخدمات الاستشارية الهندسية



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## CERTIFIED ELECTRICAL ENGINEERS



# ABOUT US

**Protek (UK) Ltd are UK Certified Electrical Engineers dedicated to a prompt professional electrical service in UK and working alongside to a few KSA consultants, providing services in Middle East zone. We are ISO9001:2015 Certified and Approved Electrical Engineers.**

**We offer a full extensive Electrical Consultancy and Electrical Compliance Services for all types of Enterprises as well as assisting business needs in the Commercial and Industrial industries, military objectives, Government and high security areas, ensuring we deliver to the highest standards whilst also understanding the need in maintaining critical systems.**

**We offer competitive pricing, attention to detail and all our Electrical staff are competent, UK Certified, operating under the mediums of customer satisfaction and high quality workmanship. We provide a free consultancy process with every client.**

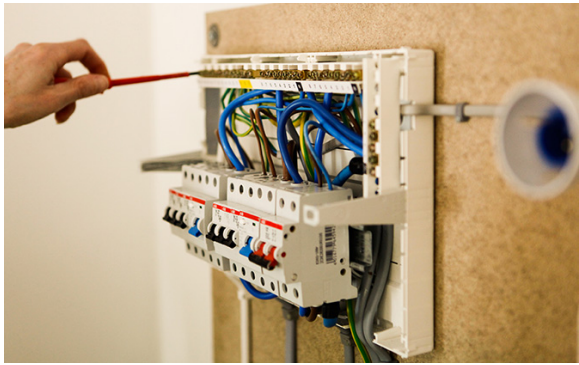
**We undertake all aspects of Electrical Engineering from initial design to complete. We aim to complete projects to the highest standard on time and within budgets. We strive for total client satisfaction, with many clients retaining our services year on year and recommending us whenever the opportunity arises.**

**This level of service has been vital to our success, placing us in strong demand in each sector for Electrical Consultancy Services.**

## **Our services are**

- Electrical Inspections and Testing of all electrical installations and Electrical Compliance
- Electrical Design and Consultancy for Architects
- Electrical Engineering Consultancy
- Certify Electrical Installations
- PAT Testing

# Electrical Inspection and Testing and Compliance



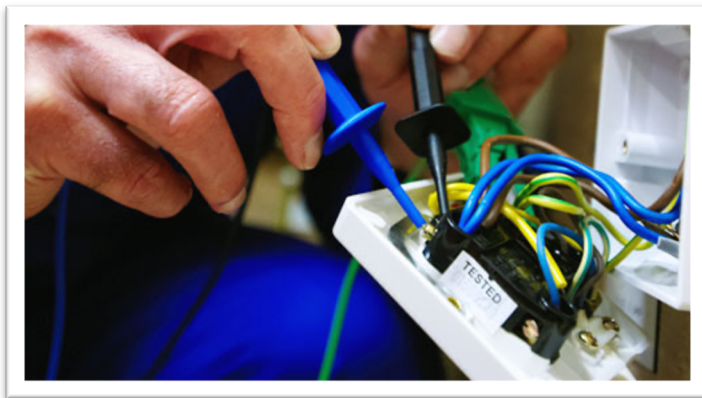
## WHAT IS AN ELECTRICAL INSPECTION AND TESTING AND THE PURPOSE

All Electrical installations deteriorate with age and use. They should therefore be inspected and tested at regular intervals to check whether they are in a satisfactory condition for continued use. Once completed an electrical certificate will be issued.

### A Periodic Inspection will

- Reveal if any of the electrical circuits or equipment are overloaded
- Find any potential electric shock risks and fire hazards
- Identify any defective electrical work
- Highlight any lack of earthing or bonding
- The extent of any wear and tear, damage or other deterioration

Tests are also carried out on wiring and fixed electrical equipment to check that they are safe. If any dangerous or potentially dangerous is found, the overall condition of the electrical installation will be declared to be "unsatisfactory" meaning that remedial action is required without delay to remove the risks to those.



## HOW OFTEN IS A PERIODIC INSPECTION REQUIRED

That will depend on how old is your property or installation. As for the first time we would need to do a deep checks and identify all the circuits and issues if they are. Then depending on the type of the property and the use of it, we will need to do at every 6 or 12 months. Also we will check the previous records and we will advise you if any issues arise



# Portable Electrical Appliances



## PORTABLE APPLIANCE TEST INSPECTIONS

A formal visual inspection by a competent person should be conducted as part of the maintenance regime. This will detect the majority of defects that can cause danger.



### Typical defects to look are

- Damage to cable coverings – cuts and abrasions
- Damage to plugs
- Non-standard joints in cables
- Equipment being used in conditions where it is not suitable – wet or dust environment

- Overheating – burn or marks

In addition, a more deep inspection by a trained person could include

- The correct fuse is being used
- The wires are attached to the correct terminals
- The terminal screw is tight
- There is no sign of internal damage – overheating, liquid, etc.

Although conventional electrical test equipment can be used to test the insulation and continuity resistance. The equipment will simply “pass or fail”.

What you will receive

Upon completion of the portable appliance inspection and testing you will receive a report that details the following as a minimum

- An inventory containing each appliance type, name, location and description
- A full set of tests results for each appliance tested
- A full list of any failed items with an explanation of their failure
- A visible Pass or Fail label on each appliance detailing the inspection date, next test due and the Inspector signature



# Testing Procedures for fixed Electrical Installations

## Before the supply is connected

- test for continuity of protective conductors
- test for continuity of all ring final circuit conductors
- test for insulation resistance
- protect by separation of circuits
- protect against direct contact with a barrier or enclosure provided during erection
- insulate non-conducting floors and walls
- test for polarity using the continuity method.

With the supply connected:

- test the earth electrode resistance
- re-check polarity using a voltmeter or approved test lamp
- test the earth fault loop impedance
- carry out functional testing (eg operation of residual current devices).

Part of the testing procedure for sub-circuits will require that individual circuits are isolated from the supply to allow testing of the insulation resistance, continuity and polarity. This may be performed in selected areas to minimise disruption, and is dependent on the type of installation and the working environment.

The Health and Safety *Electrical Test Equipment for Use by Electricians* requires that testers:

- have a clear understanding of the installation, its design and the way in which it has been installed
- are provided with full information about the system to be worked on
- establish (before testing commences) that all test devices, including leads, probes and connectors, are suitably rated for the voltages and currents which may be present in the system under test, and are correctly calibrated
- ensure that the installation to be worked on is safe for the intended tests
- ensure that the working environment does not present additional hazards, eg inadequate working space, an insecure footing, insufficient light, potentially flammable gases or vapours, or explosive or conductive dusts
- be aware of the dangers associated with the use of high voltages for insulation testing.

## Notices and other identification

The installation must be equipped with labels and notices, including:

- prominent notices to indicate that no attempt should be made to use the installation while testing is in progress
- labels for all fuses and circuit breakers to indicate their ratings and the circuits protected
- an indication of the purpose of main switches and isolators
- warning of the presence of voltages exceeding 230V on equipment or an enclosure where such a voltage would not normally be expected
- warning that voltage exceeding 230V is present between separate pieces of equipment that are within arm's reach
- warning of the danger of disconnecting earth wires at the point of connection of the earthing conductor to the earth electrode or the main earth terminal, where separate from main switchgear
- a notice to indicate the need for periodic testing of a residual current device
- a schedule at each distribution board listing the items to be disconnected (eg semiconductors) so that they will not be damaged by testing.

# TYPES OF ELECTRICAL CERTIFICATES

## ***Certification for new electrical installations***

On the completion of work on a new fixed installation (or following any additions or alterations to an existing installation which involves new circuits) the individuals responsible for the work must report to the premises owner that the installation is safe to use and ready for service. This is done in the form of an electrical installation certificate which verifies that the design, construction, inspection and test aspects of the installation comply with the requirements.

The certificate will usually be issued by the person managing the installation work (eg the designer, contractor, installer or managing agent) but will require three separate signatures from the individuals responsible for ensuring that the design, construction and inspection and testing of the system have been carried out in accordance with the requirements.

The installer should also compile an operational manual for the installation, which will include:

- a full set of circuit and schematic drawings
- all design calculations for cable sizes, cable volt drop, earth-loop impedance, etc
- leaflets or manufacturer's details for all the equipment installed
- "as fitted" drawings of the completed work where applicable
- a full specification of the installation
- copies of the electrical installation certificate, together with any other commissioning records
- the names, and contact details of the designer, the installer and the inspector/tester.

This information should form part of the safety file in any new construction, under the requirements of the Construction (Design and Management) Regulations.

## ***Periodic inspection and testing certificate***

Following completion of routine inspection and testing, a Periodic Inspection Report (PIR) should be provided, detailing particulars of the installation and a schedule of full test results to enable comparison with earlier results to assess the extent of any deterioration in the system. The certificate should also state:

- the full extent of the parts of the system tested (notes of omissions may be very important)
- any restrictions which may have been imposed on the tester and which may have limited their ability to report fully
- any dangerous conditions found during inspection and testing, instances of non-compliance and any variations that are likely to arise in the future
- the recommended date for the next periodic inspection and testing.

Issues identified in the PIR will be coded depending on the urgency of action required.

- Code 1: requires urgent attention as a dangerous or potentially dangerous condition has been identified and action is required immediately to make the installation safe.
- Code 2: requires improvement.
- Code 3: requires further investigation.
- Code 4: does not comply with regulations

Once any remedial work has been completed, a new PIR should be issued to confirm that the remedial work has been carried out in accordance with regulations.

## ***Minor electrical installation works certificate***

This simplified certificate is provided by the installer following the completion of additions, alterations or replacements to an existing electrical installation which does not extend to the provision of new circuits, eg the addition of a socket outlet or lighting point to an existing circuit, or the replacement or repositioning of a light switch.

A separate certificate must be provided for each circuit on which work has been carried out and should include a description of the works carried out, test results and methods of protecting the existing installation from indirect contact, details of earthing arrangements, etc.

## Temporary Electrical Supplies

Temporary electrical supplies need to be protected against damage and contamination. For example:

- switchgear needs to be provided with secure accommodation and to be located where it is less likely to be damaged
- the means of turning off the supply needs to be accessible at all times in case of emergency
- correctly rated fuses and circuit breakers must always be used
- makeshift arrangements, such as unprotected wiring and taped and twisted cable joints, must not be permitted
- the rating of protective equipment and switchgear must be selected to embrace the worst case fault conditions which are anticipated at that point in the electrical installation
- equipment should be specified to a national or international product standard, specification for low-voltage switchgear and control gear
- distribution cables should be located where they are not likely to be damaged by site activities and be kept clear of passageways, ladders and other services.

The quality and frequency of this maintenance should be sufficient to prevent danger so far as is reasonably practicable. The inspections and tests on the temporary installation that need to be performed include the following.

- Visual inspection for defects.
- Continuity of protective conductors.
- Insulation resistance.
- Site applied insulation.
- Dielectric tests.
- Earth fault loop impedance.
- Polarity.
- Proof testing of residual current devices, whenever appropriate.

It is recommended that inspection and testing is carried out on a planned preventive basis. The use of techniques such as equipment labelling and tagging may assist in determining effective maintenance scheduling. The frequency of inspection and testing should be determined by practical experience of use and is a matter for the judgment of the technically competent person. Information obtained from records of similar electrical installations and equipment manufacturers may be employed to determine the initial frequency, which can subsequently be adjusted to match practical experience.





## Emergency Lighting Servicing and Testing



To test an emergency lighting system, a mains power failure on the normal lighting circuit / circuits or individual luminaires must be simulated. This will force the emergency lighting system to operate via the battery supply. This test can be carried out manually or automatically.

### Manual testing

A simulated mains failure can be achieved by providing a switch to isolate all lighting circuits / individual circuits / individual luminaires. If manual testing is utilised, the following points should be considered:

In a system with a single switch for the whole building or a large circuit, after simulating the mains failure it is necessary for the tester to walk the whole building or circuit, to check all emergency luminaire are operating correctly. After restoring the mains supply, the whole building or circuit must be walked again, to check that the emergency lights are recharging.

If the emergency luminaires are individually switched, only a single walk around the building will be needed. However, the test switches could spoil the decor of the building and they must be of a type that is tamper proof. After the tests, it is recommended that the performance of the system is logged in the fire safety logbook.

### Automatic testing

If the costs of an engineer's time and the disruption caused by manual testing are excessive, [self-testing emergency lighting](#) should be considered. Different formats are available to match particular site requirements. However, the results should be recorded.

# MAINTENANCE OF ELECTRICAL INSTALLATIONS

Proper installation and maintenance is very important in both commercial and residential facilities. A faulty wiring that is not immediately given attention can result into a greater danger such as fire and electrocution.

Hiring a qualified or certified electrician is crucial in proper installation and maintenance. Especially in complicated wiring, which may require top level skills, only certified electricians are able to keep the work clean and safe. Listed below are the importance of proper installation and maintenance for your home or business edifice.

## **Good installation and maintenance is equivalent to safety**

A rule of thumb says that the worse it looks, the less likely the installation has been completed by a professional. When wirings are properly installed, wires are basically well tightened up and aligned in proper places. Some high voltage wirings are sealed in insulators to avoid accidents and unexpected electrocution. Professional electricians also follow a certain pattern or design in wiring to reflect good installations. For instance, high-voltage wires are usually hidden behind walls, which serve as their insulators. This keeps the place's surroundings clean and arranged while people that are passing by are safe from potential injuries caused by faulty wiring.



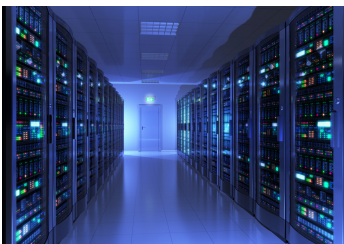
## **THERMAL IMAGING INSPECTIONS AND CHECKS**

Thermal imaging is a widely used method as it can identify problems that the naked eye cant and it is non-invasive or intrusive. Thermal imaging can detect potential problems within the electrical distribution system without the need to isolate circuits. Images can be taken of key components captured in a thermal image and a digital image. Thermal imaging gives you the ability to carry out live testing whilst meting your obligations.



## **COMMERCIAL AND RESIDENTIAL ELECTRICAL MAINTENANCE**

Our qualified and experienced professionals understand all aspects of commercial electrical systems installation and maintenance. We can work with you to plan, design and cost your requirements and make sure installations and updates are straightforward. You won't even know we're there when we come to make inspections or complete projects for you.



## **CRITICAL MAINTENANCE SERVICES**

The key to our delivery maintenance is the absolute understanding of the criticality of our clients' infrastructure, the configuration of the equipment and systems supporting it and availability of resources necessary to immediately respond to any type of emergency.

We have in place the infrastructure and personnel to deliver and support the services required by our critical customers.