MINISTRY OF DEFENCE

Defence Infrastructure Organisation

The Inspection, Testing, and Certification of Low Voltage Electrical Installations on the Defence Estate.

Practitioner Guide 2017/02

Estate Management

Document Aim:

The aim of this Practitioner Guide is to provide procedural guidance to personnel and organisations involved in the inspection, testing and certification of fixed Low Voltage (LV) electrical installations on behalf of the Ministry of Defence (MOD).

Document Synopsis:

This document provides procedural guidance on the inspection, testing, and certification of fixed LV electrical installations on the MOD estate. It is not a technical guide on the practical aspects of inspection, testing, and certification of such installations, which is left to the professional skills and judgement of the skilled person (s) undertaking the work.

The "Practitioners" to whom this Guide relates are Defence Infrastructure Organisation (DIO) personnel and other individuals or organisations who, on behalf of DIO, have interest in the installation, maintenance, and operation of electrical installations on the MOD estate.

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Who should read this: Property Managers, Private Finance Initiative Contractors, Regional Prime Contractors, Stand Alone Prime Contractors, Specialist Principal Support Providers, DIO Specialist Term Consultants, DIO M&E specialists, and Infrastructure Managers

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Equality And Diversity Impact Assessment

This policy has been Equality and Diversity Impact Assessed in accordance with the Department's Equality and Diversity Impact Assessment Tool against:

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Related Documents

JSP309 MOD Fuel and Industrial Gas Health, Safety and Environmental Protection.	JSP 375 Part 2 Volume 3 Management of Health and Safety in defence: high risk activities on the defence estate.
JSP 482 MOD Explosive Regulations	DE Specification 034 Electrical Installations
ESTC Standard No 6 Part 1 – Electrical	PG 03/09 LV Electrical Installations
PG 05/12 Inspection Maintenance & Testing of Equipment Installed at Petroleum Installations on MOD Property.	PI 07/09 Application of Part P to MOD Estate

FOREWORD

This Practitioner Guide is published by Defence Infrastructure Organisation (DIO) for application across all areas of the MOD estate and has been revised to reflect Amendment No 3: 2015 to BS 7671:2008 and supersedes Practitioner Guide 04/09. The Guide is to be used on all DIO let contracts from the date of its publication. For existing contracts, no work involving expenditure on any MOD account is to be entered into without prior authority from the appropriate MOD officer for that location or facility.

Abbreviations

AP(E)	Authorised Person (Electrical)
BF(G)	British Forces (Germany)
BS	British Standard
BS 7671	BS7671:2008 Requirements for Electrical Installations (IET Wiring Regulations) as amended
BS EN	British Standard European Norm
CDM	Construction (Design and Management) Regulations 2007 Regulations 2015
CO	Commanding Officer
CP	Competent Person
CoP	Code of Practice
DE	Defence Estates (former executive agency of the Ministry of Defence)
DIO	Defence Infrastructure Organisation (formed on 1 April 2011, when the former Defence Estates Organisation was brought together with other infrastructure functions in the MOD to form a single organisation)
DNO	Distribution Network Operator
EAL	EMTA Awards Limited
EAWR	Electricity at Work Regulations 1989
ECA	Electrical Contractors' Association
ECS	Electrotechnical Certification Scheme
EFLI	Earth Fault Loop Impedance
EIC	Electrical Installation Certificate
EICR	Electrical Installation Condition Report
ESF	Electrical Safety First
ESQCR	Electricity Safety, Quality and Continuity Regulations 2002 as amended
ESTC	Explosives Safety Transport Committee
GN3	IET Guidance Note 3 Inspection and Testing
HoE	Head of Establishment
Hz	Hertz
HMO	Houses in Multiple Occupancy
HoE	Head of Establishment
HS&EP	Health Safety & Environmental Protection
HSG	Health and Safety Guidance (issued by the HSE)
HSE	Health and Safety Executive
HSR	Health and Safety Regulation (publication issued by the HSE)
IEE	The Institution of Electrical Engineers (replaced by the IET)
IET	Institution of Engineering and Technology. The IET is a new institution formed by the joining together of the IEE (the Institution of Electrical Engineers) and the IIE (the Institution of Incorporated Engineers).
JIB	Joint Industry Board
JSP	Joint Service Publication

LMS	Land Management System
LV	Low Voltage (not exceeding 1000V a.c. between conductors or 600V a.c. between conductors and Earth)
MAC	Multi-Activity Contract
MMO	Maintenance Management Organisation
MOD	Ministry of Defence
PAT	Portable Appliance Testing
PELV	Protective Extra-Low Voltage
PFI	Private Finance Initiative
PG	Practitioner Guide
PIR	Periodic Inspection Report (now known as an EICR)
PPP	Public Private Partnership
RCD	Residual Current Device
RPC	Regional Prime Contract
SFA	Service Families Accommodation
SkP	Skilled Person (electrically)
SLA	Single Living Accommodation
SELV	Separated Extra-Low Voltage
USVF	United States Visiting Force

Contents

1.0 INTRODUCTION

1.1 Aim

1.1.1 The aim of the Practitioners Guide (PG) is to provide procedural guidance to personnel and organisations involved in the inspection, testing and certification of fixed Low Voltage (LV) and Extra Low Voltage (ELV) electrical installations on behalf of the MOD.

1.1.2 It is not a technical guide on the practical aspects of inspection, testing, and certification of such installations, which is left to the professional skills and judgement of the skilled person[1] (hereafter referred to as the Inspector) undertaking the work.

1.2 Scope

1.2.1 The scope of this document is the initial and periodic verification of electrical installations, including those in hazardous locations, within the scope of the current edition of BS 7671 *Requirements for electrical installations*.

1.3. General Requirements

1.3.1 The periodic and initial verification of electrical installations is to be performed in accordance with BS 7671, IET Guidance Note 3 - *Inspection and Testing* and the requirements and further guidance of this publication.

2.0 STATUTORY REQUIRMENTS

2.1 The legal requirement most relevant to this guide is the Electricity at Work Regulations 1989 and particularly regulation 4(2), which requires 'a*s may be necessary to prevent danger, all systems shall be maintained so as to prevent, so far as is reasonably practicable, such danger'*.

2.2 Appendix 2 of BS 7671 lists other statutory regulations with which electrical installations are legally required to comply with and the following link to the Health and Safety Executive's (HSE) website provides links to the full text of the statutory regulations most relevant to electricity:

http://www.hse.gov.uk/electricity/information/law.htm

3.0 STATUS OF BS 7671

3.1.1 Although BS 7671 itself is a non-statutory document, under the Electricity Safety, Quality and Continuity Regulations (ESQCR) failure to comply with BS 7671:2008, *Requirements for Electrical Installations* (the IET Wiring Regulations) places the Distribution Network Operator (DNO) in the position of not being compelled to supply, or continue to supply, electrical energy to the installation.[2] Furthermore, under Regulation 21 of the ESQCR compliance with BS 7671 is mandatory for all consumers' installations operating a switched alternative to a DNO's network. The Wiring Regulations may also be used in the court of law in evidence to claim compliance with a statutory requirement. Installations which conform to the standards laid down in BS7671 are regarded by the Health and Safety Executive (HSE) as likely to achieve conformity with the relevant parts of the Electricity at Work Regulations (EAWR).

3.1.2 "Wiring Regulations" and BS 7671 are used synonymously throughout this PG. Where a Regulation number is quoted it refers specifically to the Regulation number in BS 7671:2008 incorporating Amendment No 3: 2015, i.e. the 17th Edition of the IET Wiring Regulations.

3.1.3 It is implicit from Regulation 341.1 of BS 7671:2008 and explicit in regulation 4(2) of the Electricity at Work Act that systems are required to be maintained and kept in a safe condition.

[1] Skilled Person (electrically) is defined in Annex A of this guide and BS7671.
[2] Regulation 25 of the Electricity Safety, Quality and Continuity Regulations 2002.

4.0 SAFETY

4.1 Inspection and testing must be carried out in a manner that will ensure the safety of both the Inspector and others. Except for live polarity testing, phase sequencing, earth fault loop impedance, prospective fault current, and Residual Current Device (RCD) tests the electrical installation must be securely isolated and proven dead before testing is commenced. Safety arrangements are to comply with the requirements of JSP 375, Part 2 Volume 3 Chapter 3 – *Electrical Systems*.

4.2 Where the Inspector is not already appointed as a Skilled Person (as defined by JSP 375, Part 2 Volume 3) the Authorised Person (Electrical) (AP(E)) must ensure through a suitable assessment that the Inspector is familiar with the safety procedures in JSP 375, Part 2 Volume 3 before allowing them to undertake the work.

4.3 It is common for people in the electrical contracting industry to have to demonstrate their current knowledge of health and safety by being in possession of a current ECS Health and Safety Assessment Certificate. The Certificate is normally valid for a period of three years from passing the exam.

4.4 HSR25[3] provides guidance on live and dead working. With the exception of the tests mentioned in Para 4.1 of this guide live working cannot normally be justified on the MOD estate. Further guidance on safe isolation procedures for low voltage installations can be found in the Electrical Safety First.

http://www.electricalsafetyfirst.org.uk/electrical-professionals/best-practice-guides/

4.5 Test instruments used for testing of installations are to comply with BS EN 61557, and the associated test leads, clips and probes are to comply with HSE GS38[4]. The instruments and leads are to be inspected by the Inspector for damage and deterioration before use, damaged or defective instruments must not be used. The test instruments used are required to have current calibration certificates. (The formal calibration of test instruments is to be undertaken at intervals of not more than 12 months.) In addition, the Inspector should test instruments for on-going accuracy against a proprietary test box at intervals of not more than 1 month. Copies of instrument calibration certificates should be supplied to the person ordering the tests prior to the commencement of tests on site.

5.0 APPLICATION OF THE GUIDE ELSEWHERE

5.1 USVF Bases

5.1.1 The guidelines given in this PG are applicable to the full range of LV electrical installations found on MOD sites utilised by the United States Visiting Force (USVF).

5.1.2 Both in terms of quality and safety the standard of electrical work undertaken on USVF sites must not be inferior to those executed on the UK MOD sites.

5.2 Overseas Estates

5.2.1 The Secretary of State has stated[5] that he requires that "Within the United Kingdom (UK) we comply with all applicable HS&EP legislation" and that "Overseas we apply our UK arrangements where reasonably practicable and, in addition, respond to host nation's relevant HS&EP expectations."

5.2.2 The estates occupied by BF(G) apply their own local (German) regulations. The competency of the contractor is established prior to contract let and local procedures apply to the selection and appointment of the skilled person. For this reason, while the general principles mentioned in this PG may be applicable, the document will be of limited use to BF(G) staff.

[3] HSR25 Memorandum of Guidance on the Electricity at Work Regulations 1989.
[4] HSE Guidance Note GS38 Electrical Test Equipment for use by Electricians.
[5] Health, Safety and Environmental Protection in Defence, A Policy Statement by the Secretary of State for Defence, June 2013.

6.0 REQUIREMENT FOR INSPECTION AND TESTING

6.1 In order to confirm that electrical systems are in a safe condition regular inspection and testing is necessary. Regulation 4(2) of the EAWR requires that: "As may be necessary to prevent danger, all systems shall be maintained so as to prevent, so far as is reasonably practical, such danger".

6.2 The frequency and nature of the maintenance must be such as to prevent danger so far as is reasonably practicable. Regular inspection of electrical equipment, based on a suitable and sufficient risk assessment, is an essential part of any preventive maintenance plan.

6.3 There are three types of Inspection and Testing:

- Initial Verification;
- Routine Checks; and
- Periodic Inspection and Testing.

6.4 Although Regulation 622.2 of BS 7671 permits an effective continuous monitoring and maintenance regime to replace periodic inspection and testing such situations are unlikely to arise on the MOD estate.

6.5 The Inspector is to verify that there are no unaddressed product recalls on equipment about to be inspected. Using the following resources - DIO Safety Alert, Electrical Safety First or Trading Standards web sites.

https://www.gov.uk/government/collections/dio-safety-alerts
http://www.electricalsafetyfirst.org.uk/product-recalls/
http://www.tradingstandards.uk/advice/advice-recall-list.cfm

7.0 INITIAL VERIFICATION

7.1 Initial Verification is to be completed for any new work and alterations and additions. The purpose being to ensure that the equipment and accessories are to a relevant standard, the installation complies with the Wiring Regulations (BS 7671) and is safe. The responsibility for comparing inspection and test results with relevant criteria[6] lies with the Inspector.

7.2 BS 7671 requires that all installations are designed by skilled persons[7] (Regulation 132.1). The design information and data should be provided to the Inspector prior to the inspection and testing process. The Inspector should begin by carrying out a thorough visual inspection of the installation and recording their findings on suitable schedules progressively throughout the different stages of erection and before the installation is certified and put into service. Testing should also take place and be recorded. For full details of inspection and testing to be undertaken the Inspector should refer to IET Guidance Note 3, *Inspection and Testing* (GN3). Although not exhaustive, the inspection list provided in GN3 is comprehensive and the initial tests prescribed therein must be carried out in a set sequence.

7.3 The Inspector must understand the relevant criteria for the particular inspection or test. Where the designer has specified requirements particular to the installation, which may be different from those in the Wiring Regulations (BS 7671), then the Inspector should obtain the design criteria at the outset, or forward the test results to the designer for verification with the intended design. In the absence of such data the requirements of BS 7671 should be applied.

7.4 The information required by Regulation 610.2 of BS 7671 shall be made available to the Inspector, which includes the assessment of general characteristics and associated diagrams, charts and tables.

[6] Relevant Criteria are, for most part, the requirements of the Wiring Regulations (BS 7671) for the particular inspection or test.
[7] Skilled Person – 'a person with technical knowledge of or sufficient experience to enable him to avoid the dangers that electricity may create' (Definition from BS 7671:2008 and Annex A).

8.0 ROUTINE CHECKS

8.1 Formal arrangements for routine checks are required under the EAWR. Records of the checks should be kept and supplemented by defect reports from users of the premises.

8.2 Routine user checks need not be carried out by a skilled person but should be undertaken by someone[8] who is able to safely use the installation and recognise defects.

8.3 Routine user checks include: checking that defect reports have been rectified; visual inspection checks for breakages, faults, deterioration, and checking the operation of equipment e.g. operating the test button of RCDs. Routine checks should include all the items listed in Table 3.1 of GN3.

8.4 The frequency of routine checks should be set by the electrical duty holder'.[9] Recommended initial frequencies are given in Table 3.2 of GN3.

9.0 PERIODIC INSPECTION AND TESTING

9.1 Purpose

9.1.1 The IET Guidance Note 3 (GN3) states that "the purpose of Inspection and Testing is to provide an engineering view on whether or not the installation is in a satisfactory condition where it can continue to be used safely".

9.1.2 Regulation 621.2 of the Wiring Regulations (BS 7671) requires that "Periodic inspection comprising a detailed examination of the installation shall be carried out without dismantling, or with partial dismantling as required, supplemented by appropriate tests from Chapter 61 to show that the requirements for disconnection times, as set out in Chapter 41 for protective devices, are complied with". Therefore Periodic Inspection and Testing on existing installations is undertaken to:

- Ensure the safety of persons and livestock against the effects of electric shock and burns in accordance with the general requirements of the Wiring Regulations.
- Ensure protection against damage to property by fire and heat arising from an installation defect.
- Confirm the installation is not damaged or deteriorated so far as to impair safety.
- Identify installation defects and non-compliance with the requirements of the Wiring Regulations which may give rise to danger.

9.2 Limitations

9.2.1 In all cases, the extent and any specific limitations of the inspection shall be agreed beforehand between the Inspector and the person ordering the work[10]. Where specific limitations are agreed, the name of the person agreeing to the limitation i.e. the person ordering the work shall be recorded at Section D on the Electrical Inspection Condition Report.

9.2.2 Within the standard Electrical Installation Condition Report[11] (EICR) Section D: *Extent and Limitations of Inspection and Testing* there is now a requirement to state:

- The extent of the works;
- The agreed limitations;
- The reason for the agreed limitations;
- The person with whom the limitations were agreed; and

[8] This need not necessarily be a member of the maintenance team although generally the MMO will be responsible for maintenance.
[9] The electrical duty holder is the person or organisation responsible for electrical maintenance e.g. the MMO.
[10] Refer to definition of 'person ordering the work' in Annex A.
[11] As published in Appendix 6 of BS 7671.

- The operational limitations and the reason for them.

9.2.3 An EICR shall not be accepted without all of the above information. Where there is insufficient space in the form to record all the information reference should be made to another document which is to be appended to the EICR.

9.2.4 No work should be undertaken on any part of the installation containing asbestos, or a substance having the appearance of asbestos. Where a distribution board or other items of equipment contain or are thought to contain asbestos, or a substance having the appearance of asbestos, no work should be carried out on that item of equipment other than to apply a suitable label to the outside to warn of the presence of asbestos and the finding should be reported on the EICR.

9.2.5 Section D of the EICR form includes the following standard limitation:

> "It should be noted that cables concealed within trunking and conduits, under floors, non-accessible roof spaces and generally within the fabric of the building or underground, have not been inspected unless specifically agreed between the Client and the Inspector prior to the inspection."

9.2.6 Where reasonably practical, regardless of the interpretation of the above standard limitation, the following areas are to be inspected:

- Above suspended ceilings;[12]
- Below raised floors;[13]
- Within lofts and roof spaces, where an access hatch is provided and the floor is boarded or walkways are provided; and
- Generally any building void that is accessible without damaging the fabric of the building.[14]

9.2.7 Normally the following would be regarded as unreasonable limitations where they are readily accessible and it is safe to do so:

- Not inspecting the areas listed in Section 9.2.5.
- Not inspecting high level equipment (e.g. no inspection above 3m).[15]
- Not testing high level circuits (e.g. no inspection above 3m).
- No inspection of sub-main cables.
- No testing of sub-main cables.
- No inspection of the main switchgear.

9.2.8 The following issues should be resolved before signing a contract, raising an order, or starting works:

- The procedure to be followed when finding unidentified circuits;
- The Initial % sampling for the visual inspection of the internal condition of equipment;
- The Initial % sampling for testing;
- The subsequent % sampling in the event that departures are found;
- Whether high level equipment (e.g. high bay luminaires) are excluded;
- Whether fixed equipment is excluded;
- If there is access to all areas of the building;
- Any operational limitations e.g. is out of hours working required;
- Whether the incoming LV supply cable to the premises is excluded;
- Can the incoming supply be isolated to check the condition of the main switchgear;

[12] DIO have received a number of incident reports where electrical installations above suspended ceilings were in a dangerous condition. These have included two incidents of electric shock.
[13] Such as in Network Equipment Rooms.
[14] The lifting of nailed or screwed floorboards would not normally be required.
[15] DIO have received a high number of incident reports where light fittings have overheated and caused smoke or fire damage. These incidents may have been prevented by carrying out periodic inspections.

- Are LV switchgear panels excluded, including those in substations;
- Whether any thermographic surveys are required;
- Are standby generators and UPS systems excluded.
- The presence of hazardous areas within the building;

9.2.9 It should be noted that where limitations are agreed and accepted the safety of that part of the installation cannot be assured. Unnecessary limitations should, therefore, not be agreed.

9.2.10 Where operational requirements prevent testing being carried out within a building this should not preclude a thorough visual inspection of the external condition of the electrical installation within that building being carried out as a minimum. This should not be recorded as a limitation but the procedure for Inspection Deferrals should be followed which is given in Section 9.4.

9.3 **Sampling**

9.3.1 Instead of carrying out inspection and testing to the entire installation sampling may be employed in which only selected parts of the installation are inspected and tested. The justification for doing this is that the selected sample is representative of the whole of the installation. When considering sampling, the rate of sampling should be specified to inspection, and to testing as two separate activities.

9.3.2 Sampling can only be implemented where comprehensive records of the installation are available to the Inspector therefore where poor records exist sampling shall not be considered. Sampling of the internal inspection of equipment should be considered separately to the sampling of testing however a thorough visual inspection of 100% of the whole of the external condition of the electrical installation, that is not concealed, must always be carried out.

9.3.3 The Inspector should, in accordance with GN3, agree the initial sampling rates for inspection and for testing as two separate activities with the person ordering the work.[16] GN3 recommends that one procedure is “for the inspector to carry out an initial walk-round survey to establish initial sample sizes at various points throughout the installation.".

9.3.4 Table 3.3 of GN3 gives a range of sample rates for inspections and typical checks that should be carried out. For example the Table recommends that between 10% to 100% of the internal condition of accessories should be inspected for signs of damage or overheating and that the external condition of 100% of the main electrical switchgear should be inspected for signs of damage, overheating or ageing.

9.3.5 GN3 advises that the sample size for testing is at the discretion of the Inspector however Table 3.4 advises that a percentage of less than 10% is inadvisable.

9.3.6 Where records of previous Periodic Inspection Reports (PIRs), Electrical Installation Condition Reports (EICRs), Electrical Installation Certificates (EICs), plans, drawings and maintenance records exist, the following minimum inspection and testing is recommended:

- Inspection
    - 100% inspection of the external condition of the entire electrical installation.
    - 100% inspection of earthing and protective bonding conductors.
    - Where practicable 100% but not less than 10% internal inspection of the main switchgear.
    - Ideally 100% but not less than 10% internal inspection of circuit breaker connections.
    - Ideally 100% but not less than 25% internal inspection of all distribution boards.
    - 10% internal inspection of all accessories and enclosures in the installation.
    - 10% internal inspection of all electrical equipment.[17].

[16] Refer to definition of ‘person ordering the work’ in Annex A.
[17] Electrical equipment is defined by BS 7671 as “Any item for such purposes as generation, conversion, transmission, distribution or utilisation of electrical energy, such as machines, transformers, apparatus, measuring instruments, protective devices, wiring systems, accessories, appliances and luminaires."

- Testing:
    - 10% testing of final circuits, tests to include all the following tests to the sample:
        - Earth fault loop impedance testing at extremity of a radial circuit.
        - Earth fault loop impedance at all accessible socket outlets.
        - Polarity at extremity of radial circuit.
        - Polarity at all accessible socket-outlets.
        - Protective conductor continuity at accessible exposed-conductive-parts of current using equipment and accessories.
        - Where applicable, ring circuit continuity.
        - Functional testing of all RCDs in the circuit.
        - Insulation resistance between live conductors and earth (this test may be applied to the whole board, where practicable).

    - 10% testing of polarity of:
        - Class 1 equipment that cannot be readily touched – earth continuity and earth fault loop impedance.
        - All single-pole and multi-pole control devices.
        - Single contact lampholders..

    - 100% testing of:
        - Polarity at all distribution boards.
        - Earth fault loop impedance at all distribution boards.
        - Operation of test button on all RCDs.
        - Earth electrode resistance.
        - All Class 1 equipment that can be readily touched – earth continuity and earth fault loop impedance.

9.3.7 When sampling is being considered, samples selected must ensure that they are representative of the installation and that over the lifetime of the installation all equipment is inspected and tested. Selection of only convenient items or items which have been previously inspected and tested is not permitted.

9.3.8 Sampling should not be used as a justification for excluding all equipment and circuits within certain areas from inspection and testing. For example all areas above 3m shall not be wholly excluded from inspection and testing as the sample would not be representative of the installation.

9.3.9 GN3 advises that where "the inspection or testing of a sample yields poor or unacceptable results this would suggest that similar problems may exist elsewhere in uninspected or untested items." The Inspector should then advise the person ordering the work[18] of what further inspection and testing will be required. If this is carried out concurrently the limitations section of the EICR will need to reflect the new sampling size. If the works are to be carried out later, for example under a separate contract, the observations section of the EICR must recommend what further inspection and testing is required and the reasons why.

9.4 **Inspection Deferrals**

9.4.1 Where a user of a building proposes that operational necessity should prevent the comprehensive periodic inspection and testing of that building a risk assessment shall be carried out by the person ordering the works[18] which shall assess the risks of not carrying out the comprehensive inspection and testing and shall detail any measures required to mitigate those risks.

9.4.2 If the risk assessment concludes that a deferral is possible an Inspection Deferral Certificate (see Figure 1) shall be obtained from the Head of Establishment (HoE), or his authorised representative (Duty Holder). The certificate shall record the operational reasons why the inspection

[18] Refer to definition of 'person ordering the work' in Annex A.

and testing cannot be permitted on the due date and have appended to it the risk assessment. The inspection and testing shall be re-planned for no later than 12 weeks from the due date or sooner if the risk assessment requires it.

9.4.3 Even if a deferral is agreed, a thorough visual inspection, accompanied where practicable by thermographic surveys[19] (see GN3 Section 4.9 for further information), shall be undertaken by the Inspector. The risk assessment may also require other measures including some limited testing. Any limitations to the inspection and testing must be clearly identified in the resultant EICR. The Deferral Certificate shall be attached to the EICR.

9.4.4 If, during the limited inspection mentioned at Paragraph 9.4.3, the integrity of the installation is found to be questionable then the risk assessment should be revised and the Inspection Deferrals procedure repeated including, if appropriate, obtaining a new Deferral Certificate from the HoE.

DEFERRAL CERTIFICATE

To: …… (insert Name (by MMO)) of …… (MMO Organisation)

I …… (Name) …….. (Rank) (HoE or his authorised representative)

authorise the deferral of the **Periodic Electrical Inspection and Testing** of Building No: ……. due on ……. (date) until …… (Insert date before 3 months due) due to shut down not being possible for the following operational reasons:
……
……
Authority is hereby given for the Inspector to carry out a full visual inspection of the installation only with* / without* use of thermal imaging equipment on ……. (date). I am fully aware of the risks posed by a full inspection and testing of the electrical installations for these premises not being completed at this time. The risk assessment in connection with this Deferral Certificate is attached.

……. ……. (Signature) …….. (Rank & Name) ……. (Date)

* Delete as necessary

Figure 1: *Sample Deferral Certificate*.

9.5 Continuously Supervised Installations

9.5.1 As mentioned in Paragraph 6.4, where an installation is under effective management system for preventive maintenance in normal use, periodic inspection and testing may be replaced by an adequate regime of continuous monitoring and maintenance of the installation by a skilled person,[20] competent in such work, with appropriate records being kept. The records of electrical maintenance and testing may be kept on paper or computer, however, any results of tests and evidence of maintenance must be available for scrutiny.

9.5.2 In order to provide further guidance on what may be classified as a Continuously Supervised Installation the following paragraph from BS EN 60079-17:2014[21] is reproduced below however this is unlikely to be appropriate for the MOD estate but where it is then the guidance given should be adopted.

> "The objective of continuous supervision is to enable the early detection of arising faults and their subsequent repair. It makes use of existing skilled personnel who are in attendance at the installation in the course of their normal work (e.g. erection work, alterations, inspections, maintenance work, checking for faults, cleaning work, control operations, switching operations, making terminal connections and disconnections, setting and adjustment work, functional tests, measurements, etc.) who use their skill to detect faults and changes at an early stage."

[19] Additional guidance is available in BSRIA FMS 5/99: Guidance and the Standard Specification for the Thermal Imaging of LV Electrical Installations Nov 1998.
[20] Skilled Person – a person with technical knowledge of or sufficient experience to enable him/her to avoid the dangers that electricity may create (Definition from BS 7671:2008 and Annex A).
[21] BS EN 60079-17:2014 Electrical Apparatus for Explosive Gas Atmospheres – Part 17: Inspection and Maintenance of Electrical Installations in Hazardous Areas (other than mines).

9.6 **Observations of Defects in the EICR**

9.6.1 The Inspector shall inspect and test the installation with reference to the current edition of BS 7671 and shall record his findings in the EICR. The EICR shall be submitted to the MMO within 4 weeks of completing the physical inspection and testing.

9.6.2 The most important part of the EICR is the Observations section, which identifies any deficiencies and urgency for remedial action. The following classification codes[22] shall be used:

- Code C1 – Danger present. Risk of Injury. **Immediate remedial action required**.
- Code C2 – Potentially dangerous. **Urgent remedial action required**.
- Code C3 – Improvement recommended.
- Code FI - Further Investigation Required.

9.6.3 It should be noted that the previous Code 1, 2, 3, and 4 in BS 7671 do not equate respectively to the current Code C1, C2, C3, or FI.

9.6.4 Any observation given a code C1, C2, or FI classification should result in the overall condition of the installation being reported as **Unsatisfactory**.

9.6.5 The ESF Best Practice Guide 4 entitled Electrical Installation Condition Reporting: *Classification Codes for Domestic and Similar Electrical Installations*, Issue 4 gives guidance which is also relevant to non-domestic installations on the MOD estate. The ESF Guide can be freely downloaded via the link below:

http://www.electricalsafetyfirst.org.uk/electrical-professionals/best-practice-guides/

9.6.6 Further guidance on classification codes is also given in Table 3.5 of GN3.

9.6.7 After the inspection and testing has been completed a meeting should be held between the person ordering the work[23] and the Inspector so that person ordering the work can be briefed on the emerging findings of the inspection and testing including any urgent remedial works that are required.

9.7 **Remedial Action and Documentation**

9.7.1 The MMO shall address the Observations recorded in the EICR as follows:

Classification Code	Description
C1	Observations are to be reported to the person ordering the works[23] (or his representative) immediately by the Inspector and not delayed until the EICR is submitted. If immediate rectification is not possible an operational restriction shall be put into place by isolating the affected part of the installation in accordance with JSP 375 Volume 2 and advising the end-user accordingly. Where Code C1 Observations are rectified during the inspection and testing process, this is to be recorded in the Observations section of the EICR and annotated as "RECTIFIED" with the date of rectification. This will enable the full scope of observations to be monitored and assist in setting future inspection frequencies and sampling
C2	Observations shall be rectified as a matter of urgency and, where practicable, shall not be left un-remedied for longer than a maximum of four weeks from receipt of the EICR. If the four week period is to be exceeded, a risk assessment is to be undertaken against each

[22] As introduced by Amendment 1 to BS 7671:2008.
[23] Refer to definition of 'person ordering the work' in Annex A.

	Observation and mitigation measures introduced, where necessary, until the required remedial work is complete.
C3	Observations shall be assessed individually and suitable and sufficient recommendations made for the remedial work. The recommendations are to take into account the severity of the defect and its impact on electrical safety.
FI	Where the inspector cannot determine any inspection item or test result is in a satisfactory condition for the installation to be safe for continued use due to the extent and limitations on the inspection and testing, or where additional information is required such as design information or manufactures data. Further investigations are required before it can be determined that the installation is in a satisfactory condition for continued use.

Table 1: *Classifications codes*.

- Classification Code C1. Observations are to be reported to the person ordering the works[24] (or his representative) immediately by the Inspector and not delayed until the EICR is submitted. If immediate rectification is not possible an operational restriction shall be put into place by isolating the affected part of the installation in accordance with JSP 375 Volume 2 and advising the end-user accordingly. Where Code C1 Observations are rectified during the inspection and testing process, this is to be recorded in the Observations section of the EICR and annotated as "RECTIFIED" with the date of rectification. This will enable the full scope of observations to be monitored and assist in setting future inspection frequencies and sampling.
- Classification Code C2. Observations shall be rectified as a matter of urgency and, where practicable, shall not be left un-remedied for longer than a maximum of four weeks from receipt of the EICR. If the four week period is to be exceeded, a risk assessment is to be undertaken against each Observation and mitigation measures introduced, where necessary, until the required remedial work is complete.
- Classification Code C3. Observations shall be assessed individually and suitable and sufficient recommendations made for the remedial work. The recommendations are to take into account the severity of the defect and its impact on electrical safety.
- Classification Code FI. The inspector should agree with the person ordering the work the details of the item(s) requiring further investigations, what impact that has on the safety of the installation, what information is required, what further inspection and testing is required shall not be left un-remedied for longer than a maximum of four weeks from receipt of the EICR. If the four week period is to be exceeded, a risk assessment is to be undertaken against each Observation and mitigation measures introduced, where necessary, until the required remedial work is complete.

9.7.2 Non compliances with the requirements of BS 7671 which do not give rise to danger (C1 or C2) or need improvement (C3) do not need to be recorded.

9.7.4 MMOs must have formal procedures in place for remedial work to be completed within the timelines stated above. They must also have procedures in place to provide assurance that all required remedial works have been completed and that an unsatisfactory EICR has been superseded by a satisfactory Electrical Installation Certificate (EIC), Minor Electrical Installation Works Certificate, or EICR as appropriate`.

9.7.5 Remedial works must be traceable to a unique certificate or report serial number. All completed remedial work documentation shall be closed down with the relevant certification.

9.7.6 Electrical Installation Condition Reports, as well as other types of certificates and their constituent and associated documentation should be typed on similar certificates as set out in

[24] Refer to definition of 'person ordering the work' in Annex A.

Appendix 6 of BS7671. They should be signed by the person(s) who carried out the inspection and testing. Both a paper and electronic version (e.g. pdf) of the report should be provided. Where necessary updated circuit schedules, with laminated cover, should be provided at the relevant distribution boards.

9.8 Common Errors Made in EICRs

9.8.1 The following list highlights areas in the PIR/EICR which are frequently incorrectly recorded. More detailed information is given in Annex C. These discrepancies are common throughout the electrical industry:

- The person carrying out the inspection and testing not qualified or competent to do so;
- Insufficient detail recorded under extent and limitations;
- Incorrect coding (refer to ESF Best Practice Guide Number 4 Issue 4);
- Incorrect terminology used;
- Non-defects recorded as non-compliances with BS 7671;
- Clear defects or non-compliances not recorded;
- Inconsistencies between operatives regarding coding of defects (different codes allocated for same departures);
- Two codes attached against one defect non-compliance;
- Incorrect Earthing system recorded;
- Discrepancies between schedule of inspections and test results; and
- Lack of verification by the Authoriser.

9.9 Earth Fault Loop Impedance for Circuits with RCD Protection

9.9.1 Tables 41.2, 41.3 and 41.4 of BS7671 give maximum earth fault loop impedance values, to achieve fault protection, for various circuit protective devices. Where a non-delayed RCD is used in a TN system to provide fault protection, Regulation 411.4.9 allows the use of the less onerous earth fault loop impedance values given in Table 41.5. However, unexpectedly high values of earth fault loop resistance shall be investigated to rule out any fault e.g. loose connection. Where an RCD is used for fault protection it shall be verified that the over current device protecting the circuit will provide short circuit protection for the live conductors without the thermal constraints for the conductors being exceeded.

9.9.2 When designing a circuit that is proposed to have an RCD for fault protection on a TN system, where practicable, the design should achieve the earth fault loop impedance values given in Tables 41.2, 41.3 and 41.4 i.e. the disconnection time should not rely on operation of the RCD alone. However when carrying out periodic testing, disconnection times in accordance with Table 41.5 (where this Table is applicable) should not be recorded as a defect but should be investigated as above.

9.10 Fixed Equipment and Appliances.

9.10.1 In addition to the fixed installation, testing of all fixed electrical equipment in an installation should be carried out at regular intervals. Fixed electrical equipment may include:

- Equipment connected by means of a flexible cord/cable to a fused/unfused connection unit or isolator;
- Class 1 fixed appliances.

9.10.2 When fixed electrical equipment is inspected and tested as part of the periodic inspection and testing process a record of findings is to be attached to the Electrical Installation Condition Report. The Record should include as a minimum: details of the fixed equipment and its location; the findings of the visual inspection and tests[25] conducted; a satisfactory/unsatisfactory statement; and recommended remedial work.

[25] See section 9.3.6 for details of tests to be undertaken

10.0 FREQUENCY OF INSPECTION AND TESTING

10.1 Initial Inspection

10.1.1 The interval to the first inspection of the installation following initial verification is determined by the designer and entered in the Electrical Installation Certificate (EIC) prior to its issue. Guidance on the initial frequencies for periodic inspections of electrical installations is given in GN3, Table 3.2.

10.2 Existing DIO Contracts

10.2.1 Where references have been made in existing contracts for electrical inspections to be undertaken at specific intervals these intervals should be adhered to provided that at the time of a periodic inspection, in the opinion of the Inspector, the contractual time period to the next periodic inspection is deemed satisfactory. Where the Inspector recommends that the interval should be reduced and the inspection brought forward the MMO should comply accordingly.

10.3 Routine Checks

10.3.1 Guidance on the frequencies for routine checks is given in GN3, Table 3.2.

10.4 Periodic Inspection and Testing

10.4.1 The Wiring Regulations require that the frequency of periodic inspection and testing of the installation must be determined taking into account the following factors:

- Type of installation and connected equipment.
- Use and operation of the installation.
- Frequency and quality of maintenance regime.
- The external influences to which the installation is subjected.

10.4.2 Intervals for periodic inspection and testing, after the first periodic inspection are recommended by the Inspector, based on the recommendations in GN3 and taking into account the factors mentioned in the above paragraph and using their engineering judgement.

10.4.3 Guidance on the initial frequencies for periodic inspections of electrical installations against types of installation is given in GN3, Table 3.2. Table 2 below aligns the types of installation given in GN3, Table 3.2 to those likely to be found on the MOD estate.

GN3, Table 3.2	MOD Estate
Domestic	Service Families Accommodation(SFA) and Hiring in lieu of SFA
Houses in Multiple Occupancy (HMO)	Single Living Accommodation (SLA)
Commercial	Shops, Messes, Offices, Hospitals, Medical Centres, Laboratory, Classrooms, Restaurants, Lecture Rooms.
Industrial	Garages, Workshops, Plant Rooms, Boiler Rooms, Hangars, Battery Changing Facilities
Places of Public Entertainment	Cinemas, Leisure Complexes, Places of Public Entertainment
Restaurants	Pay-as-you-dine facilities
Community Centres	HIVES, Cadet Centres

Table 2: *Types of installation found on the MOD Estate*

11.0 INSTALLATIONS IN DWELLINGS

11.1 Service Families Accommodation

11.1.1 Defence Infrastructure Organisation Service Delivery Accommodation (DIO SDA) has in place a maintenance regime for Service Families Accommodation (SFAs) and substitute accommodation, which includes the inspection and testing of electrical installations and fixed equipment within the property at more frequent intervals than that recommended in the following paragraphs. However, it is not intended that changes to the existing contracts should be initiated as a result of this guidance, unless a suitable and sufficient risk assessment indicates that there is clear benefit to do so.

11.1.2 For domestic installations[26] GN3 recommends that inspection and testing should be carried out at each change of occupancy, and/or at: 10 years maximum intervals (general domestic installations) or 5 years maximum intervals (rented house and flats). Occupants of SFAs can change as frequently as every one-and-half to 3 year intervals. Experience shows that during occupancy of the SFA the fixed electrical installation normally sees no modification from the tenants and any defects are reported and rectified in a timely manner. It may therefore be considered both cost-effective and acceptable for inspections to be conducted as follows:

- **Quarterly.** Mechanical operation test of RCD's and RCBO shall be conducted by the Tenant.

- **Yearly.** Visual inspection (not necessarily by a skilled person) to check for defects, signs of deterioration, and correct operation of equipment, in accordance with Section 3.5 of GN3.

- **At Change of Occupancy**. A thorough visual inspection of the external condition of the installation with functional testing of RCDs as well as earth fault loop impedance testing at the extremity of all final circuits and at all socket outlets.

- **At a maximum of 10-yearly Intervals**. Periodic inspection and testing with all circuits being tested. The time interval may be reduced where the dwelling has had multiple occupants or where the change of occupancy inspection shows cause for concern.

11.1.3 Where the inspection regime detects a deterioration in the condition of the installation or the age of the installation is of concern then the testing should be brought forward if, in the opinion of the Inspector, this is justified. All remedial works identified as Code C1 (Danger present. Risk of injury. Immediate action required) and Code C2 (Potentially dangerous – urgent remedial action required.) must be undertaken as detailed in Section 9.7. The installation must not be recorded as "Satisfactory" if either Code C1, Code C2 or Code FI defects have been recorded on the EICR. Defects which do not affect safety (e.g. extractor fan not working) should be reported on a separate defects sheet that should be appended to the EICR.

11.1.4 During the inspection at change of occupancy, special attention is to be given to signs of overheating and burning at cable terminations. Meter tails and junction box terminations can come loose and create potential fire risks. The inherent problems with termination of aluminium conductors at meter tails are well documented and require regular checks to ensure that creepage has not adversely affected the tightness of the connections. Junction boxes should also be inspected for tightness of terminations and socket outlets should be inspected for signs of overloading.

11.1.5 A Minor Electrical Installation Works Certificate should be available for any additions and alterations to the installation[27] that do not involve the addition of a new circuit. Rewires of existing installations, the installation of new consumer units and the installation of new circuits require an Electrical Installation Certificate together with schedules of inspections and schedules of test results be issued.

11.1.6 It is advisable that the inspection is carried out before the departure of the occupants, as they can advise on any installation works carried out or concerns that they may have had on the electrical installation during their tenancy.

[26] Where a business is being operated within Service Families Accommodation, the inspection and testing regime incl. frequency is to be based on the nature of the business being operated from the premises.

[27] See also PI 07/09 titled 'Application of Part P to MOD Estate'

11.2 **Single Living Accommodations (SLAs)**

11.2.1 Although SLAs do not require local licensing authority approval such facilities are to be regarded as synonymous to an HMO and are to be inspected and tested at 5-yearly intervals and a Routine Check carried out at change of occupancy.

11.3 **All Dwellings - Fixed Electrical Appliances and Accessories**

11.3.1 Low Voltage electrical appliances supplied as part of an occupancy agreement are to be tested and confirmed as being safe for use upon change of occupancy and in any event at intervals as Table 3. A record of the equipment and tests is to be attached to the Electrical Installation Condition Report are to be retained by the buildings' records custodian.

Equipment	Change of Occupancy(See Note 1)	Combined Inspection & Test
Immersion heaters	Visual inspection and earth continuity check for Class 1 equipment	10 yearly
Storage radiators		
Electric Cooker		
Extract Fans		
Instantaneous Showers		
Class 1 luminaire		
Hard-wired Smoke Detectors[28]	Functional test	Annually
RCDs	Functional & Instrument test	10 yearly
Circuit-breakers, isolators and switching devices	Functional tests	10 yearly

Table 3: *Inspection and Testing Frequencies for Fixed Electrical Appliances*

Note 1. A check to confirm the correction operation of the equipment is to be undertaken during the Yearly Inspection. (See Section 8 – Routine Tests.)

12.0 **COMPETENCE OF INSPECTORS AND AUTHORISERS**

12.1 The Inspector[29] carrying out the inspection and testing must be competent as described in section 1.2 of the IET Guidance Note 3 (GN3).

12.2 The industry recognised qualification for operatives carrying out electrical installation work is the NVQ level 3 in Electrotechnical Services (Installations – Building and Structures). With suitable underpinning knowledge, the Practical Performance Assessment test (Achievement Measurement 2 (AM2)) may also have been taken. These qualifications meet the requirements for the issue of an Electrotechnical Certification Scheme (ECS) card issued by the Joint Industry Board (JIB) or the Scottish Joint Industry Board (SJIB). The ECS card provides evidence of an operatives qualifications, demonstration of their Health and Safety awareness, allows access to major construction sites and is a photo identification of the card holder. The JIB/SJIB assesses and grades electricians as either Electrician, Approved Electrician, or Technician. Approved Electricians are more experienced and qualified than Electricians, Technicians more so than Approved Electricians.

12.3 Inspectors should be able to demonstrate a higher level of skill and experience than that normally required for electrical installation work. Inspectors with only enough experience to gain the JIB/SJIB grade of Electrician would be unlikely to demonstrate this required level.

12.4 The Inspector should at least be able to satisfy one of the following:

- holder of a current ECS Maintenance Electrician card or;
- holder of a current ECS Installation Electrician card or;
- a time served electrician who has successfully completed a registered apprenticeship and holds one of the following qualifications:

[28] Hard-wired smoke detectors only. Battery powered ones are occupant's responsibility although occupants should be encouraged to also operate hardwired ones on a regular basis.
[29] In this guide the Inspector is the skilled person who is given the responsibility to inspect and test the electrical installation.

- EAL Level Diploma in Requirements for Electrical Installation (code 500/3526/5) or;
- NVQ/SVQ Level 3 in electrical installation work or;
- City & Guilds 2360 Electrical Installation Theory Part 2 Course Certificate.

12.5 To Authoriser[30] shall hold one of the following:

- ECS Maintenance Electrician graded to Approved Electrician or Technician or;
- ECS Installation Electrician Card graded to Approved Electrician or Technician.

12.6 The Inspector and Authoriser must also be able to demonstrate a specific knowledge of inspection and testing. They shall hold one of the following:

- City and Guilds 2391 certificate (this qualification is no longer available but is still valid) or
- City and Guilds 2394 Fundamental Inspection, Testing and Initial Verification certificate (For initial verification and certification only);
- City and Guilds 2395 Periodic inspection and testing certificate (For periodic inspection and testing only);
- EAL NQF Level 3 Diploma in Inspecting and Testing Electrotechnical Systems and Equipment (this qualification is no longer available but is still valid) or;
- EAL Level 3 Award in the Initial Verification and Certification of Electrical Installations and EAL Level 3 Award in the Periodic Inspection, Testing and Certification of Electrical Installations (together these qualifications replace the EAL Diploma).

12.7 The Inspector and Authoriser must also be able to demonstrate knowledge of the latest edition of the Wiring Regulations (BS 7671). They shall hold one of the following:

- City and Guilds 2382-10 Requirements for Electrical Installations certificate (17th Edition version) or;
- City and Guilds 2382-20 Requirements for Electrical Installations (16th to 17th edition update to BS 7671 2008) certificate or;
- EAL Level 3 Award in Requirements for Electrical Installation (Code 500/3484/4 17th Edition version) or;
- The Scottish Qualifications Authority Tailored Award in Design and Verification of Electrical Installations certificate (17th Edition version).

12.8 Work within, and inspection and testing of, hazardous area installations require additional competencies – refer to Section 17.

13.0 **COMPETENCE OF CONTRACTORS**

13.1 The following organisations register electrical contractors within the UK. It should be noted that these bodies register companies not individuals. It cannot be assumed that all employees of these registered companies are necessarily competent to carry out inspection and testing. The only electrical organisations that register individuals are the Joint Industry Board (JIB) and the IET.

13.2 The Electrical Contractors' Association (ECA), for England, Wales and Northern Ireland, and SELECT, for Scotland, are the industry trade associations owned and run by their members. Members have met the requirements of the industry recognised technical assessment and have proved themselves as businesses of good standing.

13.3 The NICEIC is a certification body. Electrical contractors on their roll have met the requirements of the industry recognised technical assessment.

[30] In this guide the Authoriser is the person who authorises the EICR for issue.

13.4 NAPIT is a certification body. Electrical contractors on their roll have met the requirements of the industry recognised technical assessment.

13.5 Stroma Certification is a certification body. Electrical contractors on their roll have met the requirements of the industry recognised technical assessment.

13.6 In England, Wales and Northern Ireland there are a number of government approved Part P competent persons schemes that register businesses that carry out electrical work in dwellings within scope of the Building Regulations Approved Document Part P. Contractors who are on a competent scheme register have been assessed by the scheme to have met minimum technical competences and are authorised to self-certify to building control that their work meets the requirements of Approved Document Part P. The government approved competent persons schemes in England and Wales are:

ELECSA

- NAPIT Certification Ltd;
- NICEIC;
- ECA;
- Stroma Certification Ltd.

13.7 Table 4, lists the electro-technical organisations mentioned above.

Business	Contact	Website
ELECSA	Phone: 0333 321 8220	www.elecsa.co.uk
Electrical Contractors' Association (ECA)	Phone: 0207 3123 4800	www.eca.co.uk
NICEIC	Phone: 0333 015 6625	www.niceic.com
NAPIT Registration Ltd	Phone: 0870 444 1392	www.napit.org.uk
SELECT	Phone: 0131 445 5577	www.select.org.uk
STROMA Certifcation Ltd	Phone: 0845 621 111	www.stroma.com

Table 4: *Electro-technical Organisations*.

Further guidance can be found at:

https://www.gov.uk/guidance/competent-person-scheme-current-schemes-and-how-schemes-are-authorised

14.0 BUILDING REGULATIONS APPROVED DOCUMENT P

14.1 Both within and outside the boundary of an MOD establishment the full requirements of the Building Regulations Approved Document P relating to electrical installation work in dwellings shall be complied with. This shall apply to all dwellings, including dwelling houses and flats leased to and by the MOD.[31]

14.2 All electrical work undertaken within MOD dwellings is to be undertaken by competent persons registered under one of the electrical self-certification schemes. The Electricity at Work Regulations, BS 7671 and, where appropriate, the appointment of electrical skilled persons under the provisions of JSP 375, Volume 3, Chapters 2 and 3, shall apply.

[31] Refer to Policy Instruction Number 07/09 dated 23 Oct 09 titled ' Application of Part P to MOD Estate' for further information.

15.0 400 HERTZ INSTALLATIONS

15.1 On aircraft servicing platforms or within aircraft servicing facilities it is quite common to find 400 Hertz power supplies supplied by rotary frequency converters or, more recently, static frequency converters. The inspection and testing of this type of the fixed installation require inspectors with knowledge and experience of 400 Hertz systems. The test equipment must also be suitable for the high frequency tests/measurements.

15.2 Inspection of previous PIRs on 400 Hertz fixed installations have revealed that such installations have been treated as normal 50 Hertz systems for the purpose of the inspection and testing by some contractors. In some instances the testing has been restricted to insulation tests with the tests being carried out with normal 50 Hertz test instruments.

15.3 As the majority of electrical contractors neither possess the expertise nor the specialist instruments to inspect and test 400 Hertz systems, care must be taken in the selection of suitable contractors for the job.

16.0 CONDUCT OF THE INSPECTION AND TESTING

16.1 Visual Inspection

16.1.1 Visual inspection is extremely important and it should always precede testing. The purpose of the visual inspection is to confirm the following aspects of the installation:

- Equipment complies with standards in accordance with the requirements of Regulation Group 511 in BS 7671:2008.
- Equipment is correctly selected and erected.
- Equipment is not damaged.
- Equipment has not deteriorated due to external influences.

16.1.2 A comprehensive inspection checklist is provided in GN3, although this is not exhaustive. Any deficiencies found on new installations, or alterations and additions must be made good at the initial verification stage and prior to handover. For an existing installation the deficiencies picked up during the periodic inspection are to be corrected by the MMO as detailed in Section 9.7 of this guide

16.1.3 Some of the pertinent checks to be carried out during the inspection phase are as follows:

- Condition and adequacy of main electric service intake.
- Presence of earthing arrangement.
- Main protective earthing conductor connections.
- Switchgear and control gear are correctly labelled in accordance with Regulations 514.1.1.and 537.2.2.6.
- Adequacy of working space and accessibility to equipment.
- Condition of enclosures including IP rating, fire rating, and general damage.
- Presence of diagrams, charts and schedules at or near equipment where required.
- Presence of labelling e.g. alternative supply warning notice.
- Non sheathed cables protected.
- Examination of cables for signs of damage or deterioration.
- Adequacy of cables for current carrying capacity.
- Adequacy of protective devices e.g. type, rated current, fault protection rating.
- Correct segregation of cables from different electrical and mechanical services.
- Suitability of accessories for external influences.
- Presence, operation and correct location of appropriate devices for isolation and switching.
- General condition of wiring systems.
- Presence and adequacy of circuit protective conductors.
- Provision of RCDs where required.
- Condition of accessories.

- Correct operation of isolators and switches.
- Presence and condition of appropriate devices for emergency switching.
- Equipment installed to minimise the build-up of heat.
- Equipment installed in appropriate ambient conditions.
- Signs of overheating of equipment or adjacent building fabric.
- Adequacy and security of mechanical supports to equipment paying particular attention to equipment that is subject to vibration.
- Correct type of lamps fitted to luminaires.

16.1.4 To comply with Regulation 537.2.2.6 each device used for isolation, including fused connection units, should be labelled with the equipment it isolates, unless it's position makes this obvious.

16.1.5 Except for dwellings, where socket outlets in a discrete area, room or zone are supplied by more than one ring or radial circuit a warning label should be prominently displayed at the consumer unit or distribution board to this effect.

16.1.6 Except for dwellings, on newly planned installations socket-outlets or fused-spur outlets are not to be supplied from an adjacent room which is on a different circuit to the rest of the room where the socket-outlet or fused spur is to be installed. Where this situation is found on existing installations immediate action is to be taken to fix a suitable label adjacent to the socket-outlet or fused spur, identifying where the circuit may be isolated, until the circuit can be reconfigured. Although extension to ring or radial circuits to an adjoining room is permitted by the Regulations there is greater risk of confusion arising from such installations in a non-domestic situation when maintenance is to be undertaken.

16.2 **Testing**

16.2.1 Detailed guidance on inspection and testing is given in GN3. The tests shown in Table 5, where relevant, including measurements where specified, are to be carried out on fixed Low Voltage electrical installations as required by BS 7671 during initial verification, or following alteration, addition, repair or modification, and periodic inspections.

Tests	Initial Verification	Periodic Inspection
Continuity of circuit protective conductors	Yes	Yes
Continuity of protective bonding conductors	Yes	Yes
Continuity of ring final circuit conductors	Yes	Yes[32]
Insulation resistance	Yes	Yes
Protection by SELV, PELV or by electrical separation	Yes	-
Protection by barriers or enclosures provided during erection	Yes	-
Insulation of non-conducting floors and walls	Yes	-
Polarity	Yes	Yes
Earth electrode resistance	Yes	Yes
Earth fault loop impedance	Yes	Yes
Prospective fault current (by enquiry or measurement)	Yes	Yes
Phase sequence	Yes	-
Functional testing operation of Circuit-breakers, isolators and switching devices	Yes	Yes
Functional testing operation of RCDs	Yes	Yes
Quarterly functional testing operation of RCDs	-	Yes[33]
Voltage drop	Yes	-

Table 5: *Testing at Initial Verification and Periodic Testing*

[32] May not be necessary if proper records of previous tests exist. Required if changes have been made to the ring final circuit.
[33] Quarterly functional testing of RCDs by use of the test button should be undertaken by the end-user where the equipment is accessible. Where the RCD is not accessible to the end-user the functional testing shall be carried out by the MMO.

17.0 **HAZARDOUS LOCATIONS**

17.1 **Introduction**

17.1.1 The following list, which is not exhaustive, provides examples of where hazardous locations can be found on MOD establishments:

- Explosive Facilities;
- Fuel storage and dispensing facilities;
- Flammable and dangerous goods stores (often embedded in non-hazardous buildings)
- Paint spray booths;
- Aircraft refuelling facilities and hangars;
- Sewage treatment plants;
- Hospital operating theatres;
- Woodworking facilities; and
- Liquefied petroleum gas and natural gas installations.

17.1.2 While electrical installations in hazardous locations are in the scope of BS 7671 the Regulations are supplemented by the requirements or recommendations of other Statutory Regulations e.g. DSEAR,[34] British Standards, MOD Regulations or Licensing Authorities.

17.1.3 In order to satisfy the requirements of the various licensing authorities for explosive facilities and petroleum installations MMOs are required to provide the appropriate electrical inspection and test certificates which comply with the lead references mentioned in the following paragraphs. Table 6 summarises the applicable forms.

	Bulk Fuel Installation	Motor Transport Fuel Installations	Packaged Inflammable Store	Battery Charging Facility	Vehicle Inspection Pits	MT Bowser Bays	LOX Servicing Facilities	Paint Spray Facilities	Explosive Storage (Cat A) Vapour	Explosive Storage (Cat B) Dusts	Explosive Storage (Cat C)	Explosive Storage (Cat D)	Other (ATEX Zones 0, 1 & 2)	Other (ATEX Zones 20, 21 & 22)
ESTC 6									X	X	X	X		
Model Form 1	X	X	X	X	X	X	X	X	-	-	-	-	X	X
Model Form 2	X	X	X	X	X	X	X	X	-	-	-	-	X	X
Model Form 3	X	X	X	X	X	X	X	X	-	-	-	-	X	X
Model Form 5	X	X	X	X	X	X	X	X	-	-	-	-	X	X
Model Form 6		X												
Model Form 7		X												
EICR	X		X	X	X	X	X	X	-	-	-	-	X	X
EICR ESTC 6	Standard NICEIC Condition Report Certificate Explosive Storage & Transportation Committee Booklet 6													

Table 6. *Summary of Inspection and Testing Certificates against Hazardous Areas.*

17.1.4 Generally, inspection and testing within hazardous areas should be carried out in accordance with the requirements of BS EN 60079-17 Explosive atmospheres – *Electrical installations inspection and maintenance*. More specific requirements are given in the sections below.

[34] Dangerous Substance and Explosive Atmosphere Regulations 2002.

17.1.5 Where specific advice on the frequency of the inspection and testing regime is not given below, the frequency should be determined in accordance with BS EN 60079-17. The maximum interval between inspections should not exceed three years without seeking expert advice.[35]

17.1.6 Details of the hazardous area facility, including zonal diagrams, equipment maintenance schedules, inspection schedules, and maintenance records are maintained in the facility's Explosion Protection Document which should be held by the Area Custodian[36].

17.1.7 Where a hazardous area is embedded within a building, specific attention is required to the scope of the inspection and testing process to establish the possibility of it giving rise to incendive sparking and an electric shock hazard in these areas[37].

17.1.8 As part of the Safety Management Systems, records of inspection, maintenance and testing should be kept for the life of the apparatus/installation and compared against current records to identify any deterioration that is taking place. A suitable data base should be set established to record details of installed equipment and to record the defects found during the inspection process. To enable the defects to be grouped and to enable the database to be interrogated by defect types, it is necessary to have a standard set of defect codes. This would also enable the database to be shared between authority and service providers. A set of defect codes is given in Table 7.

Defect Code	Code Description
1	Ex electrical equipment not appropriate for hazardous area
2	Circuit identification not appropriate
3	Enclosure defective
4	Gaskets, seals defective
5	Unauthorised modification
6	Cable gland defect
7	Ex d flame path defective (this might also cover enclosure, glands, sealing etc.)
8	Lamp defect
9	Electrical connection defect
10	Cable, trunking, conduit
11	Earthing defect
12	Cable insulation defect
13	Equipment insulation defect
14	Overload, temperature protection device defective
15	Corrosion, weather, vibration defect
16	Dust or dirt defect
17	Ex p pressurisation or pre-start purge defect
18	Intrinsically safe earthing defect
19	Intrinsically safe printed circuit board defect
20	Intrinsically safe circuit defect, e.g. invasion of power circuit, point to point screen defect

Table 7: *Defect Codes for Hazardous Area Equipment*

17.2 **Types of Electrical Inspection in Hazardous Areas**

17.2.1 The requirements of BS 7671 and GN3 shall be complied with but shall be supplemented by the requirements of BS EN 60079-17 Explosive atmospheres – Part 17: *Electrical installations inspection and maintenance*.

[35] Expert advice is considered to be the relevant expert within the Defence Infrastructure Organisation.
[36] Further details of the Explosion Protection Document can be found in JSP375, Volume 2 Leaflet 56.
[37] Further information can be found in JSP375 Part 2-Volume 1, Chapter 1 'Working on and Testing Low Voltage Equipment in Hazardous Areas.)

17.2.2 BS EN 60079-17 details of three grades of inspection are shown in Table 8:

Grade of Inspection	Description of Inspection
Visual Inspection	Inspection which identifies, without the use of access equipment or tools, those defects, such as missing bolts, damage to enclosures, broken external earth connections etc., which are apparent to the eye.
Close Inspection	Inspection which encompasses those aspects covered by a visual inspection and, in addition, identifies those defects, such as loose bolts, which will be apparent only by the use of access equipment, for example steps (where necessary) and tools. Close Inspections do not normally require the enclosure to be opened, or the equipment to be de-energised.
Detailed Inspection	Inspection which encompasses those aspects covered by closed inspection and in addition identifies those defects such as loose terminations, which will only be apparent by opening the enclosure and/or using, where necessary, tools and test equipment.

Table 8: *Three grades of inspection*

17.3 **Explosive Storage Facilities**

17.3.1 Reference should be made to the following documents for guidance on inspection and testing in explosive facilities:

- Joint Services Publication 482 MOD Explosive Regulations, Part 2 Chapter 8, *Safety Standards for Electrical Installations and Equipment in Explosives*.
- Joint Services Publication 482 MOD Explosives Regulations, Part 3 Chapter 18 Works Services, *The Control and Protection of Contractors in Explosive Facilities*
- ESTC Standard No. 6 Part 1 (as amended) - Electrical.
- BS EN 60079-17 (as amended) Explosive Atmospheres Part 17: *Electrical Installations inspection and maintenance*.
- BS EN 62305 – *Protection against lightning*.

17.3.2 The inspection and test results are to be recorded in the appropriate MOD forms detailed in ESTC Standard No. 6 Part 1.

17.3.3 Minimum frequencies for periodic inspection and testing are given in Section 19 and 20 of ESTC Standard No. 6 Part 1, Electrical. For very large buildings sample testing may be introduced for periodic testing with the agreement of the Head of Establishment. 100% Initial inspection and testing is required.

17.4 **Fuel Storage and Dispensing Facilities (excl. MTFIs).**

17.4.1 Reference should be made to the following documents for guidance on inspection and testing in fuel storage and dispensing areas:

- BS EN 60079 series, specifically BS EN 60079-17 (as amended) Explosive Atmospheres Part 17: *Electrical Installations inspection and maintenance*.
- Practitioner Guide 05/12 *Inspection, Maintenance & Testing of Equipment Installed at Petroleum Installations on MOD Property*.
- BS 7671: 2008 Requirements for Electrical Installations (as amended)

17.4.2 Inspection and testing should be carried out in accordance with Section 6 of PG 05/12 which gives general guidance but refers to BS EN 60079-17 for detail.

17.4.3 Frequencies of periodic verification should be carried out in accordance with Section 6 of PG 05/12.

17.4.4 The flowchart at Figure 2 identifies the relevant forms to be used for each type of inspection (Visual, Close, and Detailed) and the resultant action to be taken.

17.5 **Mechanical Transport Filling Installations (MTFIs)**

17.5.1 Reference should be made to the following documents for guidance on inspection and testing in Mechanical Transport Fuel and Installations facilities:

- BS EN 60079 series, specifically BS EN 60079-17 (as amended) Explosive Atmospheres Part 17: *Electrical Installations inspection and maintenance*.
- APEA/EI: *Design, Construction, Modification, Maintenance & Decommissioning of Filling Stations* (as amended) – the 'Blue Book'.
- Design and Maintenance Guide (DMG) 14, *Mechanical Transport Fuelling Installations*.
- BS 7671 : 2008 Requirements for Electrical Installations (as amended)

17.5.2 Both the initial verification and certification and the periodic inspection and testing should be carried out in accordance with Section 14 of the APEA/EI document: Design, Construction, Modification, Maintenance & Decommissioning of Filling Stations and utilising the Model Certificates at Annex D.

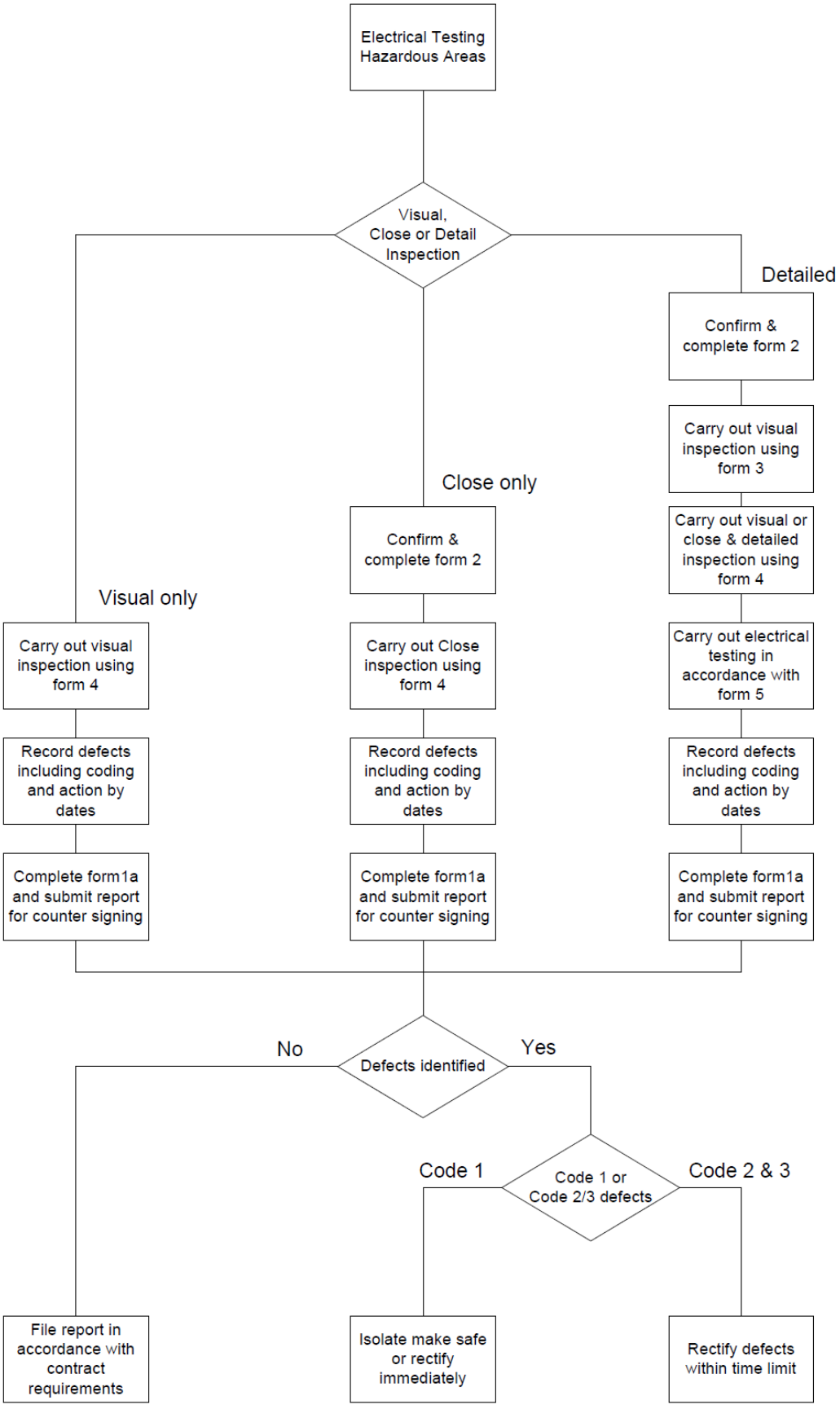

Figure 2. *Electrical Inspection and Testing in Fuel Storage and Dispensing Facilities.*

17.6 **Skilled Persons for Hazardous Areas Work**

17.6.1 Inspection and testing of installations in hazardous areas shall only be undertaken by suitably qualified and experienced inspectors with formal evidence of relevant experience and training.

17.6.2 Knowledge, skills, and competences of operatives undertaking electrical inspection and maintenance work in DSEAR classified areas are given in BS EN 60079-17 (Annex B.4) which stipulates that: "The competency of responsible persons, technical persons with executive function and operatives shall be verified and attributed, at intervals not exceeding 5 years on the basis of sufficient evidence that the person:

- Has the necessary skills required for the scope of work;
- Can act competently across the specified range of activities; and
- Has the relevant knowledge and understanding underpinning the competency."

and in addition is to have

- A practical understanding of explosion protection principles and techniques;
- An understanding and ability to read and assess engineering drawings;
- Working knowledge and understanding of relevant standards in explosion protection, particularly IEC 60079-10-1, IEC 60079-10-2, IEC 60079-14 and IEC 60079-19;
- A basic knowledge of quality assurance, including the principles of auditing, documentation, traceability of measurement and instrument calibration.

17.6.3 The assessment of skilled persons shall meet the requirements at paragraph 17.6.2. In addition:

- For petroleum installations the skilled person will be required to demonstrate to the Authorised Person (Petroleum) that they have sufficient knowledge on how to operate a Multi-gas Indicator and carry out continual monitoring, and are aware of the risk and hazards associated with petroleum products.

- For explosive facilities, where applicable, the skilled person will be required to demonstrate to the Authorised Person (Electrical) that they have sufficient knowledge and experience on Lightning Protection Systems and Conducting Floors.

17.6.4 There are currently a number of certification schemes in use throughout the UK for personnel competencies working on equipment for explosive atmospheres. The most recently introduced scheme is the IECEx, which is an international based scheme. Details of the IECEx Scheme can be found in the IECEx Publication: IECEx 05.[38] Many centres also run the CompEx Scheme mainly for operatives but in recent times they have also begun introducing modules for designers.

18.0 **CERTIFICATION AND CONDITION REPORTING**

18.1 Following inspection and testing of the new or existing installation certification or reporting shall be provided in accordance with Table 6. The appropriate documentation shall be handed to the person ordering the work.[39,40]

18.2 Table 9 summaries the type of report or certificate appropriated for the work completed. The reports, certificates, schedule of inspections, schedule of test results and any other associated documentation shall be kept on record for the life of the installation.

[38] IECEx Scheme for Certification of Personnel Competencies for Explosive Atmospheres – Rules of Procedure
[39] Refer to definition of 'person ordering the work' in Annex A.
[40] For initial verification "work" refers to the installation work (and not inspection and testing), whilst for EICR it refers to the inspection and testing.

Installation Type	Type of Work Completed	Type of Documentation Required
Non-Hazardous	Replacement of equipment such as accessories or luminaires, but not the replacement of distribution boards or similar items.	Minor Electrical Installation Works Certificate
Non-Hazardous	Alterations or additions that do not include the provision of a new circuit but not the replacement of a distribution board or similar items.	Minor Electrical Installation Works Certificate
Non-Hazardous	New Installation or change to existing installation including the replacement of a distribution board.	Electrical Installation Certificate together with a schedule of inspection and a schedule of test results.
Non-Hazardous	Periodic Inspection and Testing.	Electrical Installation Condition Report together with a schedule of inspection and a schedule of test results
Hazardous	Any electrical work in explosive facilities.	MOD Forms as detailed in ESTC Standard No 6 Part 1
Hazardous	Any electrical work in Mechanical Transport Fuelling Installation, and fuel storage and dispensing facilities..	Model certificates and reports at Annex D.
Hazardous	Any other electrical work in a hazardous areas.	The appropriate certificate and/or forms applicable to Non-Hazardous areas.

Table 9: *Type of Work and the Required Documentation*

19.0 **ASSURANCE PROCESSES**

19.1 Although the MOD has the primary responsibility for ensuring fixed installations are safe and fit for continued use this responsibility is often discharged to the MMOs. The MMOs are, therefore, obliged to provide assurance to DIO that the MOD estate is compliant with Statutory and MOD mandatory requirements. This level of assurance requires that the fixed installation is not only periodically inspected and tested but that any defects observed in the EICR are actioned and rectified within an appropriate timescale.

19.2 There are currently three levels of cross-checks on the MMOs' assurance systems:

- Joint Asset File Compliance Checks undertaken jointly by the MMO and DIO staff in accordance with PG EM/02. This involves a basic check that EICRs are current for the related asset and that work orders have been raised to rectify the defects observed in the EICR.

- The Authorising Engineer (AE) Audit Report includes inspection of sample building files to see if a process is in place to undertake periodic inspection and testing and that defects are being rectified within reasonable timescales and correctly documented. It is recognised that these checks cannot realistically be deemed a representative sample.

- The Senior Authorising Authority Review. This review ensures that the AEs are undertaking the checks on sample building files as mentioned in the previous paragraph above and, where necessary, their findings are being followed up by the MMO.

20.0 **COMMERCIAL PREMISES LET TO TENANTS**

20.1 Many commercial leases pass both repairing responsibility and the responsibility of compliance with regulations to the occupying tenant however the situation can be more complex. The MOD as a landlord may have retained a repairing responsibility which extends to the electrical installation. Also they may have inherent liabilities for dwellings under the Defective Premises Act 1972. Personnel involved in inspection, testing and certification are urged to liaise with the Land Management System (LMS) estate surveyors involved in the management of properties so as to ascertain where the ambit of responsibility lies.

20.2 Where repairing responsibilities have not been transferred to the tenant care should be taken to observe the reserved rights of entry under the lease and to only pursue those works which remain the landlord's responsibility.

20.3 It is recommended that the submission of a satisfactory Electrical Installation Condition Report (EICR) by the landlord forms part of any tenancy agreement.

21.0 **SITES IN DISPOSAL**

21.1 Sites in disposal do not require the same level of maintenance as occupied sites however the Occupiers Liability Act 1957 places a duty of care on the occupier such that a visitor will be reasonably safe in using the premises for the purposes for which he is invited or permitted by the occupier to be there. Also the Occupiers Liability Act 1984 places a duty of care on the occupier to ensure that trespassers do not suffer any injury.

21.2 Under the Defective Premises Act those carrying out works in connection with the provision of new dwellings, including builders and design consultants, are liable to the owner or any subsequent purchaser of the property for defective work that renders the dwelling unfit for habitation. Therefore any original defects, that render the dwelling unfit for habitation, should be resolved before disposal. However the Act does not apply to repairs and a claimant would not be able to bring a claim any longer than six years after the construction or conversion of the dwelling.

21.3 The policy of the DIO is to undertake the minimum necessary pre-disposal work, subject to Health & Safety issues, value for money and affordability.[41] Although sites in disposal should be free of any Code C1 and Code C2 defects identified in the latest Electrical Installation Condition Report (EICR) this may be achieved by simply removing and disposing of the offending part of the installation. Where the problems are more widespread an electric service disconnection may be considered.

21.4 Where an electric service to a site in disposal has been removed periodic verification of the electrical installation on that site is not necessary. Periodic verification of other sites in disposal may be limited if the site remains unoccupied for an extended length of time however the periodic verification and issue of an EICR should still take place but without the comprehensive inspection and testing that would be normally necessary for a site under occupation.

21.5 Regardless of how the site is to be disposed of full disclosure of all existing Electrical Installation Certificates (EICs), EICRs and any other relevant paperwork should be given. Any safety related issues, such as Code C1, Code C2, Code FI defects, and non-compliances with BS7671, should be brought to the attention of the prospective proprietor in writing making reference to the relevant documentation (e.g. the EICR).

[41] Defence Infrastructure Interim Land and Property Disposal Strategy, DIO, October 2011, paragraph 37.

Annex A – Definitions

Authoriser	The person who authorises for issue the EICR. *Note: The competence criteria for an Authoriser is given in section 13 of this guide.*
Blue Book	The APEA/EI publication *Design, construction, modification, maintenance and decommissioning of filling stations*.
Competent Person	A person who possesses sufficient technical knowledge and experience for the nature of the work to be undertaken, and is able at all times to prevent danger, and where appropriate injury, to themselves and others. *Note: The competency of Inspectors and Authorises is defined in Section 12.*
Continuous Supervision	Frequent attendance, inspection, service, care and maintenance of the electrical installation by skilled personnel who have experience in the specific installation and its environment in order to maintain the installation in a satisfactory condition.
Danger	Risk of injury to persons (and livestock where expected to be present) from fire, electric shock, burns, arcing and explosion arising from use of electrical energy, and mechanical movement.
Defect	Damage or deterioration of an installation that is otherwise compliant with BS7671.
Departure	A deliberate decision not to comply fully with the requirements of BS7671, for which the designer must declare that the resultant degree of safety is not less achievable than full compliance.
Duty Holder	Every person who has, by virtue of a contract or tenancy, an obligation of any extent in relation to the maintenance or repair of non-domestic premises, or any means of access or egress to or from. This includes the CO/HoE, DIO Service Manager and any Maintenance Management Organisation (MMO). In this guidance the 'Duty Holder' refers to the CO/HoE unless it is clearly shown that someone else is carrying out the duties on their behalf e.g. 'DIO Service Manager as Duty Holder' or the 'MMO as Duty Holder'.
Electrical Appliance	An item of current-using equipment other than a luminaire or an independent motor.
Electrical Equipment	Any item for such purposes as generation, conversion, transmission, distribution or utilisation of electrical energy, such as machines, transformers, apparatus, measuring instruments, protective devices, wiring systems, accessories, appliances and luminaires.
Fixed Equipment	Equipment designed to be fastened to a support or otherwise secured in a specific location.
Hazardous Area (Location)	Area in which an explosive atmosphere is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of apparatus.
Houses in Multiple Occupancy (HMO)	A building or part of a building (flat) which is occupied by more than one household and where at least one of the households share or lacks access to basic amenities (cooking, toilet etc.) and occupation by the households is as their main residence and it is the sole residential use of the accommodation. HMOs include bedsits, hostels, accommodation above shops, shared houses and flats, houses partly converted into self-contained flats and buildings fully converted into self-contained flats where the conversion work does not comply with the 1991 Building Regulations and where less than two thirds of the flats are occupied by long leaseholders. See sections 254-259 of the Housing Act 2004 for a full definition.
Injury	In the context of the guidance: Death or injury caused by electrical means or from fire or explosion initiated by electrical energy.
Inspection	Examination of an electrical installation using all the senses as appropriate.
Inspector	In this guidance the "Inspector" refers to a Competent Person who is given the responsibility to inspect and test an electrical installation. *Note: The competence criteria for an Inspector is given in section 13 of this guide.*
Maintenance Management Organisation (MMO)	The generic term MMO has been used to represent the contractor providing maintenance services under all delivery methods, e.g. PPP, PFI, RPC, MAC or Stand Alone Prime.
Non-compliance	A non-conformity with the requirements of BS7671 that may give rise to danger.
Person ordering the work	A competent person whose has suitable and sufficient electrical skills and experience to have the ability to agree sampling rates, in accordance with Section 9.3 of this guide, and prepare risk assessments for Inspection Deferrals, in accordance with Section 9.4 of this guide.
Portable Equipment	Electrical equipment that is moved while in operation or which can be easily moved from one place to another while connected to the supply.

Single Living Accommodation (SLA)	Domestic accommodation designed for the use of single (unaccompanied) serviceman or servicewoman. For the purpose electrical inspection and testing a SLA is to be regarded as HMO.
Skilled Person (electrically)	A skilled person(electrically) who possesses, as appropriate to the nature of the electrical work to be undertaken, adequate education, training and practical skills, and who is able to perceive risks and avoid hazards which electricity can create. *Notes*: 1. The term '(electrically)' is assumed to be present where the term 'skilled person' is used throughout this document, unless advised otherwise. 2. *A Skilled Person working on the MOD estate will need to be assessed as a Skilled Person in accordance with the requirements of JSP 375 Volume 3.*
System	An electrical system in which all the electrical equipment is, or may be electrically connected to a common source of electrical energy and includes such source and such equipment.
Testing	Implementation of measures to assess an electrical installation by means of which its effectiveness is proved. This includes ascertaining values by means of appropriate measuring instruments, where measured values are not detectable by inspection.
Wiring Regulations	BS7671:2008 Requirements for Electrical Installations (IET Wiring Regulations) as amended.

Annex B – Further References

- The Electricity Safety, Quality and Continuity Regulations 2002, Statutory Instrument 2002 No. 266
- BS EN 60079 series, specifically BS EN 60079-17:2014 Electrical Apparatus for Explosive Gas Atmospheres – Part 17: *Electrical Installations Inspection and Maintenance*
- BS EN 61010 Safety Requirements for Electrical Equipment for Measurement, Control, and laboratory Use
- BS 7671:2008 Requirement for Electrical Installations IET Wiring Regulations Seventeenth Edition incorporating Amendment No3:2015
- *17th Edition IET Wiring Regulations: Inspection, Testing and Certification*, Eighth Edition (2015) by Brian Scaddan
- APEA/EI: *Guidance for Design, Construction, Modification, Maintenance & Decommissioning of Filling Stations* (June 2011)
- BSRIA FMS 5/99: *Guidance and the Standard Specification for the Thermal Imaging of LV Electrical Installations* (Nov 1998)
- Defence Estates Specification 034 Electrical Installations Edition 1 2004
- Electrical Safety First's Best Practice Guide Number 4, Electrical Installation Condition Reporting, Classification Codes for Domestic and Similar Electrical Installations, Issue 4
- ESTC standard No. 6 Requirements for the Commissioning, Inspection, Testing and Maintenance of Works for Explosive Facilities 2006 Part 1 – Electrical
- HSE GS38 (4th Edition): *Electrical Test Equipment for use on low voltage electrical systems*
- HSE INDG345 (Rev 1): *Safety in Electrical Testing at Work*
- HSR 25 (3rd Edition): *Memorandum of Guidance on the Electricity at Work Regulations 1989*
- IET Code of Practice for the In-service Inspection and Testing of Electrical Equipment. 4th Edition
- IET Guidance Note 3 Inspection and Testing 7th Edition
- JSP 482 MOD Explosive Regulations
- NICEIC From the Helpline 17th Edition 1st Amendment
- NICEIC Inspection Testing and Certification 17th Edition 1st Amendment
- NICEIC Snags and Solutions Part 1: Earthing and Bonding 17th Edition 3rd Amendment
- NICEIC Snags and Solutions Part 2: Wiring Systems 17th Edition 3rd Amendment
- NICEIC Snags and Solutions Part 3: Inspection and Testing 17th Edition 3rd Amendment

Annex C – Common Errors and Misconceptions in EICRs

This Annex lists and discusses some common errors and misconceptions regarding inspection and testing. All Electrical Installation Condition Reports (EICR) should be reviewed before being accepted and if they are found to contain errors, including the ones listed below, they should be returned to the Inspector to be corrected.

C.1 Insufficient detail of fault and location

Error
The Observations section on the EICR provides insufficient detail of the defect and its location.

Comment
The Observations section should include sufficient detail about the location and nature of the fault in order that the person instructed to rectify the defect is able to locate and understand what the fault is.

It may be necessary or easier to include in the Observations a photograph of the fault.

C.2 Limitations not agreed

Error
Agreed limitations section of the EICR is filled in without consultation with the person ordering the work[42] or the limitations are not recorded.

Comment
Works must not commence until limitations are agreed with the person ordering the work[42] in accordance with section 9.2 of this guide.

C.3 Insufficient or no detail in the summary of condition

Error
The summary of condition of the installation is either empty or gives insufficient detail.

Comment
This section requires careful consideration of the results of the periodic inspection and testing. Minimal descriptions such as 'poor', 'good' or 'recommend a rewire' are not acceptable nor is just re-listing comments made in the observations section.

The NICEIC states that It may be necessary or appropriate to explain the implications of an EICR in a covering letter. For example, where an installation has deteriorated or been damaged to such an extent that it's safe serviceable life can reasonably be considered to be at an end, a recommendation for renewal should be made in a covering letter, giving adequate supporting reasons. Reference to the covering letter should be made in the EICR summary.[43]

[42] Refer to definition of 'person ordering the work' in Annex A.
[43] NICEIC Inspection Testing and Certification including Periodic Reporting, 6th Edition.

C.4 Incorrect Classification Code

Error
Incorrect or inconsistent classification coding recorded on the EICR. Different Inspectors record the same defect with different classification codes.

Comment
Inspectors should consult the ESC Best Practice Guide Number 4 Issue 3 and GN3 table 3.5. Borderline cases should be discussed with the senior Inspector and a common approach agreed. Inspectors should be selected in accordance with section 13.0 of this guide. The EICR should be reviewed before submission to the person ordering the work.[44]

C.5 Two Classification Codes given to one observation

Error
Two classification codes are given against one observation on the observations section of the EICR.

Comment
Observations should have only one classification code. It may be necessary to make multiple observations relating to the same defect but observations should be unique.

C.6 Incorrect Terminology Used

Error
Inspectors use incorrect terminology in the EICR.

Comment
Inspectors should refer to the definitions given in BS 7671 and the references given in Annex B of this document.

C.7 Items complying with BS7671 recorded as Non-Compliances

Error
Non-compliances affecting safety not recorded or non-departures from BS7671 recorded as a danger or non-compliance.

Comment
Inspectors should consider the guidance of GN3 table 3.5 Classification of danger and non-compliances before recording observations. Defects (including any damage, deterioration, dangerous conditions and non-compliance with the requirements of the Wiring Regulations) which have an effect on safety should be recorded.

Minor departures from the Wiring Regulations (BS 7671) which do not affect safety do not necessarily need to be recorded.

Observations recorded on the EICR should not, where not affecting safety, include items of equipment that are not working.

The following items are commonly included in the EICR Observations section but are in fact compliant with the Wiring Regulations (BS 7671) and should therefore not be recorded:

- Absence of Earthing and /or bonding of metallic sinks and baths (unless they are extraneous - conductive - parts in their own right).
- The use of re - wireable fuses (where they provide adequate circuit protection).

[44] Refer to definition of 'person ordering the work' in Annex A.

- Absence of bonding connections to boiler pipe work (where the pipe work is not an extraneous - conductive - part in its own right).
- The use of plain green sleeving on CPCs
- The use of BS3871 circuit breakers.
- Barriers inside distribution boards absent. Provided that live parts cannot be accessed without a key or a tool.

C.8 Incorrect Earthing system recorded

Error
The Earthing arrangements section of the EICR incorrectly records the installations Earthing arrangement.

Comment
Visual inspection alone may not be enough to verify the Earthing arrangement. Consultation with site staff and of site records may be necessary. If it is not readily apparent the Inspector should not guess.

C.9 Inconsistency between Schedule of Inspections and Observations

Error
The Observations section records a defect but the Inspections Schedule does not.

Comment
The Inspector should refer to the Schedule of Inspections whilst carrying out inspection and testing. Defects should be recorded in the Observations section and the Schedule of Inspections contemporaneously. The Schedule of Inspections should not be filled in by someone other than the Inspector.

Where there are multiple Inspectors each Inspector should have a working copy of a Schedule of Inspections. The schedules should then be collated into a single Inspection Schedule by a single Inspector.

C.10 Prospective Fault Current Incorrectly Recorded

Error
The phase to earth prospective fault current is incorrectly recorded as the prospective fault current for a three phase installation.

Comment
Inspectors should be aware of the following guidance given section 2.7.16 of GN3 "With some instruments, the voltage between lines cannot be measured directly. Where this is the case, it can be assumed that for three-phase supplies, the maximum balanced prospective short-circuit level will be, as a rule of thumb, approximately twice the single-phase value. This figure errs on the side of safety."

C.11 No Inspecting or Testing carried out at locations above 3m

Misconception
Parts of the installation above 3m are not tested or inspected at all citing guidance given in GN3.

Comment
GN3 does not give a recommendation that inspection or testing is carried out only in accessible locations of the installation. Although there is guidance that a few specific tests can be limited to accessible equipment all other relevant tests should still be carried out. Internal inspection of equipment should also be carried out in accordance with section 9 of this guide and section 3.9 of GN3.

Inspection of the external condition of *all* of the installation should always be carried out.

Table 3.4[45] of GN3 lists *tests* to be carried out where practicable on existing installations, the first test of which is "protective conductors continuity" where the recommendation is that accessible exposed-conductive-parts of current using equipment and accessories are tested. Note 5 of this table states that accessibility is generally considered to be within 3m from the floor.

Table 3.4 also lists the "Earth fault loop impedance" test to be carried out with a measurement to be taken at the extremity of every radial circuit. This should be carried out on all circuits. There is no guidance stating that this does not have to be carried out on parts of the installation above 3m.

Tests GN3 recommends do not need to be carried out where the item is not accessible are:

- Protective conductors continuity at current using equipment.
- Polarity at socket outlets.
- Earth fault loop impedance at socket outlets (unless it is at the extremity of a radial circuit).

Tests recommended to be carried out by GN3 regardless of accessibility are:

- Polarity at the extremity of a radial circuit (this may be the last socket outlet in the circuit).
- Earth fault loop impedance at the extremity of a radial circuit.
- Bonding conductors continuity.
- Ring circuit continuity.
- Insulation resistance.
- Functional tests.

Parts of the installation that it is proposed not to inspect or test are limitations and as such should be agreed with the person ordering the work,[46] before the work commences and in accordance with Section 9.2 of this guide.

[45] Table 3.4 *Testing to be carried out where practicable on existing installations*.
[46] Refer to definition of 'person ordering the work' in Annex A.

Annex D – Model Forms for Petroleum Facilities.

D1. The following model forms are provided for use in connection with the verification, certification, inspection and testing of petroleum facilities.

Form 1a – Hazardous Area Periodic Condition Installation Report (3 pages)
Form 1b - Initial Verification Certificate (3 pages)
Form 2 – Electrical Supply Characteristics (2 pages)_
Form 3 – Electrical Installation Periodic Visual Report (4 pages)
Form 4 – Visual, Close, and Detailed Hazardous Area Equipment Report (7 pages)
Form 5 – Electrical Installation Test Results (4 pages)
Form 6 – MTFI Certificate of Electrical Inspection and Testing for Enforcement Purposes (2 Pages)
Form 7 - MTFI Electrical Periodic Inspection Report (5 pages)

HAZARDOUS AREA PERIODIC INSTALLATION CONDITION REPORT

Site:		Building/Facility:	
Client:			
Type of inspection:- Visual, Close or Detail * * Delete as applicable			
DSEAR assessment/drawings (reference & date):			
Applicable hazardous area zones * Delete as applicable	0*	1*	2*
	20*	21*	22*

THE FOLLOWING TEST CERTIFICATES IS/ARE APPLICABLE TO THIS CERTIFICATE

	APPLICABLE (tick those that apply)		COMPLETE
Electrical Supply Characteristics	Yes ☐	No ☐	Form 3
Electrical Installation - Visual Inspection only	Yes ☐	No ☐	Form 4
Hazardous Area - Visual, Close and Detail Inspection Report	Yes ☐	No ☐	Form 5
Electrical Installation - Inspection and Test	Yes ☐	No ☐	Form 6

DETAILS OF THE INSTALLATION WHICH IS THE SUBJECT OF THIS REPORT

Establishment Address:

Building No:

Estimated age of installation years

Evidence of additions/alterations Yes No Date of last inspection (date)

EXTENT AND LIMITATIONS OF INSPECTION AND TESTING

Extent of the installation covered by this report

Agreed limitations including the reasons:

Agreed with:

Operational limitations including the reasons (see page no)

The inspection and testing detailed in this report and accompanying schedules have been carried out in accordance with **BS 7671** (IET Wiring Regulations) / **BS EN60079 part 17** (ATEX Equipment Maintenance Regulations), DELETE AS APPROPRIATE, as amended to:

It should be noted that cables concealed within trunking and conduits, under floors, in roof spaces, and generally within the fabric of the building or underground, have not been inspected unless specifically agreed between the client and inspector prior to the inspection.

Site:	Building/Facility:

SUMMARY OF THE CONDITION OF THE INSTALLATION

General condition of the installation (in terms of electrical safety)

Overall assessment of the electrical installation in terms of its suitability for continued use

A* **Satisfactory** as far as could be ascertained

B* **Suitable for continued use** subject to defects being remedied before date(s) shown on the accompanying Inspection & Testing Report

C* **Unsatisfactory,** defects observed are of a dangerous nature and require immediate attention

* Delete as applicable

RECOMMENDATIONS

Where the overall assessment of the suitability of the installation for continued use above is stated as **UNSATISFACTORY**, I / we recommend that any observations classified as 'Danger present' (code C1) are acted upon as a matter of urgency.

Or

Suitable for continued use, I/we recommend that following observation 'Potentially dangerous' (code C2) numbers _____ identified within the report are action by (date)

I / we recommend that the installation is further inspected and tested by (date)

DECLARATION

I/We, being the person(s) responsible for the inspection and testing of the electrical installation (as indicated by my/our signatures below), particulars of which are described above, having exercised reasonable skill and care when carrying out the inspection and testing, hereby declare that the information in this report, including the observations and the attached schedules, provides an accurate assessment of the condition of the electrical installation taking into account the stated extent and limitations in section D of this report.

Inspected and tested by:	**Report authorised for issue by[1]:**
Name (Capitals)	Name (Capitals)
Signature	Signature
For/on behalf of	For/on behalf of
Position Address	Position Address
Post code	Post code
Date	Date

SCHEDULE(S)

schedule(s) of inspection and schedule(s) of test results are attached.

The attached schedule(s) are part of this document and this report is valid only when they are attached to it. The extent of liability of the signatories is limited to the work described above as the subject of this Certificate

For the INSPECTION AND TESTING of the installation:

Signature: Date: Name (In BLOCK LETTERS)

Maintenance Management Organisation (MMO)	I, the MMO, have received the completed periodic condition certificate and report, and have been fully informed of the result of the inspection and test.
	Signature: Date: Name (IN BLOCK CAPITALS):

[1] The authorising manager/supervisor shall be a representative of the organisation, who is competent in the field of maintenance that this certificate refers to. They shall also be fully aware of the relevant requirements of BS7671 / BS EN 60079 as appropriate

CONDITION REPORT GUIDANCE FOR RECIPIENTS

1. This Report is an important and valuable document which must be retained for the life of the installation
2. The purpose of this Condition Report is to confirm, so far as reasonably practicable, whether or not the installation referred to in this report is in a satisfactory condition for continued service. The Report should identify any damage, deterioration, defects and/or conditions which may give rise to danger.
3. The person ordering the Report should have received the “original” Report and the inspector should have retained a duplicate.
4. The “original” Report should be retained in a safe place and be made available to any person inspecting or undertaking work on the electrical installation in the future. If the property is vacated, this Report will provide the new owner /occupier with details of the condition of the electrical installation at the time the Report was issued.
5. Where the installation incorporates a residual current device (RCD) there should be a notice at or near the device stating that it should be tested quarterly. For safety reasons it is important that this instruction is followed.
6. The Extent and Limitations should identify fully the extent of the installation covered by this Report and any limitations on the inspection and testing. The inspector should have agreed these aspects with the person ordering the Report and with other interested before the inspection was carried out.
7. Some operational limitations such as inability to gain access to parts of the installation or an item of equipment may have been encountered during the inspection. The inspector should have noted these in the remedial action form.
8. For items classified as **C1 (“Danger present”)**, the safety of those using the installation is at risk, and it is recommended that a competent person undertakes the necessary remedial work immediately.
9. For items classified as **C2 (“Potentially dangerous”)**, the safety of those using the installation may be at risk and it is recommended that a competent person undertakes the necessary remedial work as a matter of urgency.
10. Where it has been stated that an observation requires further investigation the inspection has revealed an apparent deficiency which could not, due to the extent or limitations of the inspection, be fully identified. Such observations should be investigated as soon as possible.
11. A further examination of the installation will be necessary, to determine the nature and extent of the apparent deficiency.
12. The "original" Certificate should be retained in the asset file and be shown to any person inspecting or undertaking further work on the electrical installation in the future.

INITIAL VERIFICATION CERTIFICATE

Site:		Building/Facility:	
Client			
DSEAR Assessment & Drawings (reference & date)			
Applicable hazardous area zones * Delete as applicable	0*	1*	2*
	20*	21*	22*

THE FOLLOWING TEST CERTIFICATES IS/ARE APPLICABLE TO THIS CERTIFICATE

	APPLICABLE (tick which applies)		COMPLETE
Electrical Supply Characteristics	Yes	No	Form 3
Hazardous Area - Detail Inspection Report	Yes	No	Form 5
Electrical Installation - Initial Verification Tests	Yes	No	Form 1

DESCRIPTION AND EXTENT OF THE INSTALLATION

Description of installation:

Extent of installation covered by this certificate:

(Use continuation sheet if necessary) see continuation sheet

Tick boxes as appropriate

New Installation	
Addition to an Existing Installation [See Note 2]	
Alteration to an existing installation	

FOR DESIGN

I/We being the person(s) responsible for the design of the **electrical installation**, (as indicated by my/our signatures below), particulars of which are described above, having reasonable skill and care when carrying out the design hereby CERTIFY that the design work for which I/we have been responsible is to the best of my/our knowledge and belief in accordance with **BS7671** and/or **BS EN 60079** (delete or leave as appropriate), to (date) except for the departures, if any as follows:

The extent of liability of the signatories is limited to the work described above as the subject of this Certificate
For the DESIGN of the installation:

Signature:	Date:	Name (IN BLOCK LETTERS):

FOR CONSTRUCTION

I/We being the person(s)responsible for the construction of the **electrical installation** (as indicated by my/our signatures below), particulars of which are described above, having reasonable skill and care when carrying out the construction hereby CERTIFY that the construction work for which I/we have been responsible is to the best of my/our knowledge and belief in accordance with **BS7671** and/or **BS EN 60079** (delete or leave as appropriate), to (date) except for the departures, if any as follows:

Site:	Building/Facility:

The extent of liability of the signatories is limited to the work described above as the subject of this Certificate
For the CONSTRUCTION of the installation:

Signature:	Date:	Name (IN BLOCK LETTERS):	Constructor

FOR INSPECTION & TESTING

I/We being the person(s) responsible for the inspection and testing of the **electrical installation** (as indicated by my/our signatures below), particulars of which are described above, having reasonable skill and care when carrying out the inspection and testing hereby CERTIFY that the inspection and testing for which I/we have been responsible is to the best of my/our knowledge and belief in accordance with **BS7671** and/or **BS EN 60079** (delete or leave as appropriate), to (date) except for the departures, if any as follows:

The extent of liability of the signatories is limited to the work described above as the subject of this Certificate

Signature:	Date:	Name (IN BLOCK LETTERS):	Inspector

PARTICULARS OF SIGNATORIES TO THIS INITIAL VERIFICATION CERTIFICATE

Designer	Installation:		
	Name:	Company:	e-mail
	Address:	Post Code:	Tel No:
Constructor	Installation:		
	Name:	Company:	e-mail
	Address:	Post Code:	Tel No:
Inspector (Tester)	Installation:		
	Name:	Company:	e-mail
	Address:	Post Code:	Tel No:
Quality Assurance Inspector	Installation:		
	Name:	Company:	e-mail
	Address:	Post Code:	Tel No:

AVAILABILITY OF SUPPORTING DOCUMENTATION

REFERENCE	SUPPORTING DOCUMENTATION	AVAILABLE (tick all that apply)		LOCATION
	As-Built Drawings	Yes	No	
	DSEAR Zonal Classification Drawings & Assessments	Yes	No	
	Schedule of equipment in accordance with requirements of BS EN 60079	Yes	No	

NOTES:

1. This Certificate is valid only when the applicable Forms are attached
2. Where more than one new installation for a hazardous area is concerned, and different contractors are used to design, install and test each of those installations, separate initial verification certificates shall be issued for each installation.
3. The ‘Installation’ to be recorded refers to the particular installation which this certificate applies to.

INITIAL VERIFICATION CERTIFICATE GUIDANCE FOR RECIPIENTS

1. This safety Certificate has been issued to confirm that the electrical installation work to which it relates has been designed, constructed, inspected and tested in accordance with BS7671 and/or BS EN 60079 (delete as appropriate), to (date).
2. You should have received an “original” Certificate and the contractor should have retained a duplicate. If you were the person ordering the work, but not the owner of the installation, you should pass this Certificate, or a full copy of it including the schedules, immediately to the owner.
3. The "original" Certificate should be retained in the asset file and be shown to any person inspecting or undertaking further work on the electrical installation in the future. The Construction (Design and Management) Regulations require that, for a project covered by those Regulations, a copy of this Certificate, together with schedules, is included in the project health and safety documentation.
4. This Certificate is intended to be issued only for a new electrical installation or for new work associated with an addition or alteration to an existing installation. It should not have been issued for the inspection of an existing electrical installation. A "Periodic Installation Condition Report" should be issued for such an inspection.

ELECTRICAL SUPPLY CHARACTERISTICS

Site:	Building:

SUPPLY CHARACTERISTICS AND EARTHING ARRANGEMENTS tick boxes and enter details as appropriate

Earthing arrangements[1]	Number and Type of Live Conductors	Nature of Supply Parameters	Supply Protective Device Characteristics
TN-C ☐			
TN-S ☐	a.c. ☐ d.c. ☐	Nominal Voltage, U/U_o [2] V	
TN-C-S ☐	1-phase, 2 wire ☐ 2-wire ☐	Nominal frequency, f [2] Hz	Type:
TT ☐	2 phase, 3 wire ☐ 3-wire ☐	Prospective Fault Current, I_{pf} [3] kA	
IT ☐	3 phase, 3 wire ☐ other ☐	External Fault Loop Impedance, Z_e [3] Ω	Rated Current: A
Other sources of supply (to be detailed on attached schedule ☐	3 phase, 4 wire ☐ ☐		
	Confirmation of supply polarity ☐		

PARTICULARS OF INSTALLATION REFERRED TO IN THE CERTIFICATE

Means of Earthing	Maximum Demand
Distributor's facility ☐	Maximum demand (load) kVA or Amps?
Installation earth electrode ☐	**Details of Installation Earth Electrode** (where applicable): Type (e.g. rod(s), tape etc); Location; Electrode Resistance to Earth Ω

MAIN PROTECTIVE CONDUCTORS

Earthing Conductor Material		Csa: mm²	Continuity and connection verified Yes or No?
Main Protective Bonding Conductors Material		Csa: mm²	Continuity and connection verified Yes or No?
To Incoming water and/or gas service ☐	To LPS ☐	To other elements	

[1] Earthing Systems are restricted to TN-S only. Authorising Engineer shall be consulted if any other earthing system is installed.
[2] By enquiry.
[3] By enquiry or measurement.

Site: Building:

MAIN SWITCH OR CIRCUIT-BREAKER

BS, Type and No. of Poles | Current rating A | Voltage Rating V

Location | Fuse rating or setting A

Rated Residual Operating Current $I_{\Delta n}$ A, and operating time of mS (at $I_{\Delta n}$) (applicable only where an RCD is used as a main circuit-breaker)

COMMENTS ON EXISTING INSTALLATION

In the case of an addition or alteration see Section 633 of BS7671:2008 (2011):

SCHEDULES

The attached schedules are part of this document and this certificate is valid only when they are attached to it.

Schedule of Inspections and Schedules of test Results are attached. (enter quantities of schedules attached)

QUALITY ASSURANCE

I hereby certify that the information regarding electrical supply characteristics for the specified building contained in this form is correct to the best of my knowledge and compliant with the relevant regulations.

Name (BLOCK CAPITALS):

Signature:

Date:

ELECTRICAL INSTALLATION PERIODIC VISUAL INSPECTION RECORD SHEETS

Site:	Building:

OUTCOMES	*Acceptable condition*		*Unacceptable condition*	State **C1** or **C2**	*Improvement recommended*	State **C3**	*Not verified*	**N/V**	*Limitation*	**LIM**	*Not applicable*	**N/A**

ITEM NO	**DESCRIPTION**	**OUTCOME** (Use codes above. Provide additional comment where appropriate. C1, C2 and C3 coded items to be recorded)	*Further investigation required? (**Y** or **N**)*
1.0	**DISTRIBUTOR'S / SUPPLY INTAKE EQUIPMENT**		
1.1	Service cable condition		
1.2	Condition of service head		
1.3	Condition of tails - Distributor		
1.4	Condition of tails - Consumer		
1.5	Condition of metering equipment		
1.6	Condition of isolator (where present)		
2.0	**PRESENCE OF ADEQUATE ARRANGEMENTS FOR OTHER SOURCES SUCH AS MICRO GENERATION (551.6; 551.7)**		
3.0	**EARTHING / BONDING ARRANGEMENTS (411.3; Chap 54)**		
3.1	Presence and condition of distributor's earthing arrangement (542.1.2.1; 542.1.2.2)		
3.2	Presence and condition of earth electrode connection where applicable (542.1.2.3)		
3.3	Provision of earthing / bonding labels at all appropriate locations (514.13)		
3.4	Confirmation of earthing conductor size (542.3; 543.1.1)		
3.5	Accessibility and condition of earthing conductor at MET (543.3.2)		
3.6	Confirmation of main protective bonding conductor sizes (544.1)		
3.7	Condition and accessibility of main protective bonding conductor connections (543.3.2; 544.1.2)		
3.8	Accessibility and condition of all protective bonding connections (543.3.2)		
4.0	**CONSUMER UNIT(S) / DISTRIBUTION BOARD(S)**		
4.1	Adequacy of working space / accessibility to consumer unit / distribution board (132.12; 513.1)		
4.2	Security of fixing (134.1.1)		
4.3	Condition of enclosure(s) in terms of IP rating etc (416.2)		
4.4	Condition of enclosure(s) in terms of fire rating etc (526.5)		
4.5	Enclosure not damaged/deteriorated so as to impair safety (621.2(iii))		
4.6	Presence of main linked switch (as required by 537.1.4)		
4.7	Operation of main switch (functional check) (612.13.2)		
4.8	Manual operation of circuit-breakers and RCDs to prove disconnection (612.13.2)		
4.9	Correct identification of circuit details and protective devices (514.8.1; 514.9.1)		
4.10	Presence of RCD quarterly test notice at or near consumer unit / distribution board (514.12.2)		
4.11	Presence of non-standard (mixed) cable colour warning notice at or near consumer unit /distribution board (514.14)		

Inspected by:

Name (Capitals):
Signature:
Date:

Site:		Building:	
4.12	Presence of alternative supply warning notice at or near consumer unit / distribution board (514.15)		
4.13	Presence of other required labelling (please specify) (Section 514)		
4.14	Examination of protective device(s) and base(s); correct type and rating (no signs of unacceptable thermal damage, arcing or overheating) (421.1.3)		
4.15	Single-pole protective devices in line conductor only (132.14.1; 530.3.2)		
4.16	Protection against mechanical damage where cables enter consumer unit / distribution board(522.8.1; 522.8.11)		
4.17	Protection against electromagnetic effects where cables enter consumer unit / distribution board /enclosures (521.5.1)		
4.18	RCD(s) provided for fault protection – includes RCBOs (411.4.9; 411.5.2; 531.2)		
4.19	RCD(s) provided for additional protection - includes RCBOs (411.3.3; 415.1)		
5.0	**FINAL CIRCUITS**		
5.1	Identification of conductors (514.3.1)		
5.2	Cables correctly supported throughout their run (522.8.5)		
5.3	Condition of insulation of live parts (416.1)		
5.4	Non-sheathed cables protected by enclosure in conduit, ducting or trunking (521.10.1)		
	To include the integrity of conduit and trunking systems (metallic and plastic)		
5.5	Adequacy of cables for current-carrying capacity with regard for the type and nature of installation (Section 523)		
5.6	Coordination between conductors and overload protective devices (433.1; 533.2.1)		
5.7	Adequacy of protective devices: type and rated current for fault protection (411.3)		
5.8	Presence and adequacy of circuit protective conductors (411.3.1.1; 543.1)		
5.9	Wiring system(s) appropriate for the type and nature of the installation and external influences (Section 522)		
5.10	Concealed cables installed in prescribed zones (see Section D. Extent and limitations) (522.6.101)		
5.11	Concealed cables incorporating earthed armour or sheath, or run within earthed wiring system, or otherwise protected against mechanical damage from nails, screws and the like (see Section D. Extent and limitations) (522.6.101; 522.6.103)		
5.12	Provision of additional protection by RCD not exceeding 30 Ma:		
	For all socket-outlets provided for use within an electrostatic protected area.		
	For supply to mobile equipment not exceeding 32 A rating for use outdoors (411.3.3)		
	For cables concealed in walls or partitions (522.6.102; 522.6.103)		
5.13	Provision of fire barriers, sealing arrangements and protection against thermal effects (Section 527)		
5.14	Band II cables segregated / separated from Band I cables (528.1)		
5.15	Cables segregated / separated from communications cabling (528.2)		
5.16	Cables segregated / separated from non-electrical services (528.3)		
5.17	Termination of cables at enclosures – indicate extent of sampling in Section D of the report (Section 526):		
	Connections soundly made and under no undue strain (526.6)		
	No basic insulation of a conductor visible outside enclosure (526.8)		
	Connections of live conductors adequately enclosed (526.5)		
	Adequately connected at point of entry to enclosure (glands, bushes etc.) (522.8.5)		
5.18	Condition of accessories including socket-outlets, switches and joint boxes (621.2(iii))		

Inspected by:

Name (Capitals)
Signature
Date

Site:	Building:		
5.19	Suitability of accessories for external influences (512.2)		
6.0	**LOCATION(S) CONTAINING A BATH OR SHOWER**		
6.1	Additional protection for all low voltage (LV) circuits by RCD not exceeding 30 Ma (701.411.3.3)		
6.2	Where used as a protective measure, requirements for SELV or PELV met (701.414.4.5)		
6.3	Shaver sockets comply with BS EN 61558-2-5 formerly BS 3535 (701.512.3)		
6.4	Presence of supplementary bonding conductors, unless not required by BS 7671:2008 (701.415.2)		
6.5	Low voltage (e.g. 230 volt) socket-outlets sited at least 3 m from zone 1 (701.512.3)		
6.6	Suitability of equipment for external influences for installed location in terms of IP rating (701.512.2)		
6.7	Suitability of equipment for installation in a particular zone (701.512.3)		
6.8	Suitability of current-using equipment for particular position within the location (701.55)		
7.0	**OTHER PART 7 SPECIAL INSTALLATIONS OR LOCATIONS**		
7.1	List all other special installations or locations present, if any. (Record separately the results of particular inspections applied.)		
8.0	**GENERAL**		
8.1	Presence and correct location of appropriate devices for isolation and switching		
8.2	Adequacy of access to switchgear and other equipment		
8.3	Particular protective measures for special installations and locations		
8.4	Connection of single pole devices for protection in line/phase conductors only		
8.5	Correct connection of accessories and equipment		
8.6	Presence of under voltage protective devices		
8.7	Selection of equipment and protective measures appropriate to external influences		
8.8	Selection of appropriate functional switching devices		
8.9	Unauthorised modifications		
8.10	Presence of diagrams, instructions, circuit charts and similar information		
8.11	Presence of danger notices and other warning notices, including that they are securely fixed, durable and legible		
8.12	Labelling of protective devices, switches and terminals		
8.13	Identification of conductors		
8.14	Required labels fitted at the point of connection to every earthing conductor, and earth electrode, the main equipotential bonding and the points of every bonding conductor to every extraneous conductive part.		
8.15	Correct Functioning of Circuit Breakers		
8.16	Correct Functioning of Relays		
8.17	Correct Functioning of Switches		
8.18	Correct Functioning of Push Buttons		
8.19	Correct Functioning of Contactors		
8.20	Correct Functioning of Meters		
8.21	Correct Functioning of Instruments		
8.22	Tightness of all Connections, including integrity of main and supplementary bonding.		
8.23	Integrity of locks and seals		

Note: Numbers in brackets are reference to BS7671:2008(2011)

Inspected by:

Name (Capitals)
Signature
Date

REMEDIAL ACTIONS ARISING FROM ELECTRICAL INSTALLATION PERIODIC VISUAL INSPECTION

Site:		Building:		
OBSERVATION	**CLASSIFICATION CODE**	**RECOMMENDED REMEDIAL ACTION**	**Complete By**	**Date of Action Completed**

Completed by:

Name (Capitals)

Signature

Date

Classification Codes
Each observation relating to a concern about the safety of the installation shall be attributed an appropriate Classification Code selected from the standard codes C1, C2 and C3 as follows:

Code C1 'Danger present' Risk of injury. Immediate remedial action required
Code C2 'Potentially dangerous' Urgent remedial action required
Code C3 'Improvement recommended
Code FI 'The inspector cannot determine any inspection item or test result is in a satisfactory condition for the installation to be safe for continued use

VISUAL, CLOSE & DETAILED INSPECTIONS SPECIFIC TO HAZARDOUS AREAS

Site:	Building:

INSPECTION of Ex d, Ex e & Ex n equipment (page 1 of 2)

	Check That	Grade of Inspection		
		Detail	Close	Visual
	EQUIPMENT			
1	Equipment is appropriate to the EPL/Zone requirements of the location			
2	Circuit and/or equipment documentation is appropriate to the EPL/zone requirements of the location			
3	Temperature class correct			
4	Circuit identification is correct			
5	Circuit identification is available			
6	Enclosure, glass(es) parts and glass-to-metal sealing gaskets and/or compounds are satisfactory			
7	There are no unauthorised modifications			
8	There are no visible unauthorised modifications			
9	Bolts, cable entry devices (direct and indirect) and blanking elements are of the correct type and are complete and tight			
	- visual check			
10	Flange faces are clean and undamaged and gaskets, if any, are satisfactory			
11	Flange gap dimensions are within maximal values permitted			
12	Lamp rating, type and position are correct			
13	Electrical connections are tight			
14	Conditions of enclosure gaskets is satisfactory			
15	Enclosed-break and hermetically sealed devices are undamaged			
16	Restricted breathing enclosure is satisfactory			
17	Motor fans have sufficient clearance to enclosure and/or covers			
18	Breathing and draining devices are satisfactory			
B	**INSTALLATION**			
1	Type of cable is appropriate			
2	There is no obvious damage to cables			
3	Sealing of trunking, ducts, pipes and/or conduits is satisfactory			
4	Stopping boxes and cable boxes are correctly filled			
5	Integrity of conduit system and interface with mixed system is maintained			
6	Earthing connections, including any supplementary earthing bonding connections are satisfactory (for example connections are tight and conductors are of sufficient cross-section) - physical check			
	- visual check			
7	Fault loop impedance (TN systems) or earthing resistance (IT systems) is satisfactory			
8	Insulation resistance is satisfactory			
9	Automatic electrical protective devices operate within permitted limits			
10	Motor electrical protective devices operate within permitted limits			
11	Automatic electrical protective devices are set correctly (auto-reset not possible)			
12	Motor electrical protective devices are set correctly (auto-reset not possible)			
13	Special condition of use (if applicable) are complied with			
14	Cables not in use are correctly terminated			
14	Obstructions adjacent to flameproof flanged joints are in accordance with IEC 60079-14			
15	Variable voltage/frequency installation in accordance with documentation			

Site:	Building:

INSPECTION of Ex d, Ex e & Ex n equipment (page 2 of 2)				
	Check That	Grade of inspection		
		Detail	**Close**	**Visual**
C	**ENVIRONMENT**			
1	Equipment is adequately protected against corrosion, weather, vibration and other adverse factors			
2	No undue accumulation of dust and dirt			
3	Electrical insulation is clean and dry			

Inspected by:

Name (Capitals)

Signature

Date

Enter the following against the test as appropriate:

Sat To indicate an inspection has been carried out and the result is satisfactory
Unsat To indicate an inspection was unsatisfactory
N/A To indicate an inspection is not applicable

Site:	Building:

INSPECTION of Ex i equipment (page 1 of 2)

	Check That	Grade of inspection		
		Detail	Close	Visual
	EQUIPMENT			
	Equipment is appropriate to the EPL/Zone requirements of the location			
1	Circuit and/or equipment documentation is appropriate to the EPL/zone requirements of the location			
2	Equipment installed is that specified in the documentation - Fixed equipment only			
3	Circuit and/or equipment category and group correct			
4	Equipment temperature class is correct			
5	Installation is clearly labelled			
6	There are no unauthorised modifications			
7	There are no visible unauthorised modifications			
8	Safety barrier units, relays and other energy limiting devices are of the approved type, installed in accordance with the certification requirements and securely earthed where required			
9	Electrical connection are tight			
10	Printed circuit boards are clean and undamaged			
	INSTALLATION			
1	Cables are installed in accordance with documentation			
2	Cable screens are earthed in accordance with the documentation			
3	There is no obvious damage to cables			
4	Sealing of trunking, ducts, pipes and/or conduits is satisfactory			
5	Point-to-point connections are all correct			
6	Earth continuity is satisfactory (for example connections are tight and conductors are of sufficient cross-section)			
7	Earth connections maintain the integrity of the type of protection			
8	The intrinsically safe circuit is isolated from earth or earthed at one point only (refer to documentation)			
9	Separation is maintained between intrinsically safe and non-intrinsically safe circuits in common distribution boxes or relay cubicles			
10	As applicable, short-circuit protection of the power supply is in accordance with the documentation			
11	Special condition of use (if applicable) are complied with			
12	Cables not in use are correctly terminated			

Inspected by:

Name (Capitals)
Signature
Date

Enter the following against the test as appropriate:

Sat To indicate an inspection has been carried out and the result is satisfactory
Unsat To indicate an inspection was unsatisfactory
N/A To indicate an inspection is not applicable

Site:	Building:

INSPECTION of Ex i equipment (Page 2 of 2)

	ENVIRONMENT			
Check That		Grade of inspection		
		Detail	**Close**	**Visual**
1	Equipment is adequately protected against corrosion, weather, vibration and other adverse factors			
2	No undue accumulation of dust and dirt			

Inspected by:

Name (Capitals)
Signature
Date

Enter the following against the test as appropriate:

Sat	To indicate an inspection has been carried out and the result is satisfactory
Unsat	To indicate an inspection was unsatisfactory
N/A	To indicate an inspection is not applicable

Site:	Building:

	INSPECTION of Ex p equipment			
	Check that:	Grade of inspection		
		Detail	**Close**	**Visual**
	EQUIPMENT			
1	Equipment is appropriate to the EPL/Zone requirements of the location			
2	Equipment group is correct			
3	Equipment temperature class is correct			
4	Equipment circuit identification is correct			
5	Equipment circuit identification is available			
6	Enclosure, glass(es) parts and glass-to-metal sealing gaskets and/or compounds are satisfactory			
7	There are no unauthorized modifications			
8	There are no visible unauthorised modifications			
9	Lamp rating, type and position are correct			
	Installation			
1	Type of cable is appropriate			
2	There is no obvious damage to cables			
3	Earthing connections, including any supplementary earthing bonding connections are satisfactory (for example connections are tight and conductors are of sufficient cross- section) – physical check			
	Visual check			
4	Fault loop impedance (TN systems) or earthing resistance (IT systems) is satisfactory			
5	Automatic electrical protective devices operate within permitted limits			
6	Automatic electrical protective devices are set correctly			
7	Protective gas inlet temperature is below maximum specified			
8	Ducts, pipes and enclosures are in good condition			
9	Protective gas is substantially free from contaminants			
10	Protective gas pressure and/or flow is adequate			
11	Pressure and/or flow indicators, alarms and interlocks function correctly			
12	Pre-energising purge period is adequate			
13	Conditions of spark and particle barriers of ducts for exhausting the gas in hazardous area are satisfactory			
	ENVIRONMENT			
1	Equipment is adequately protected against corrosion, weather, vibration and other adverse factors			
2	No undue accumulation of dust and dirt			

Inspected by:

Name (Capitals)
Signature
Date

Enter the following against the test as appropriate:

Sat To indicate an inspection has been carried out and the result is satisfactory
Unsat To indicate an inspection was unsatisfactory
N/A To indicate an inspection is not applicable

REMEDIAL ACTIONS ARISING FROM INSPECTIONS

Site:	Building:				
OBSERVATION	**CLASSIFICATION CODE**	**FAULT CODE**	**REMEDIAL ACTION**	**COMPLETE BY**	**DATE COMPLETED**

Inspected by: _____ Name (Capitals)

Signature:_____

Date_____

Classification Codes
Each observation relating to a concern about the safety of the installation shall be attributed an appropriate Classification Code selected from the standard codes C1, C2 and C3 as follows:

- Code C1 'Danger present' Risk of injury. Immediate remedial action required
- Code C2 'Potentially dangerous' Urgent remedial action required
- Code C3 'Improvement recommended'

Fault Codes
Each observation relating to a concern about the condition of the installation shall be attributed an appropriate Fault Code selected from table 1 of this document

Table 1 Fault Codes

Defect Code	Code Description	Defect Code	Code Description
1	Ex electrical equipment not appropriate for hazardous area	11	Earthing defect
2	Circuit identification not appropriate	12	Cable insulation defect
3	Enclosure defective	13	Equipment insulation defect
4	Gaskets, seals defective	14	Overload, temperature protection device defective
5	Unauthorised modification	15	Corrosion, weather, vibration defect
6	Cable gland defect	16	Dust or dirt defect
7	Ex d flame path defective (this might also cover enclosure, glands, sealing etc.)	17	Ex p pressurisation or pre-start purge defect
8	Lamp defect	18	Intrinsically safe earthing defect
9	Electrical connection defect	19	Intrinsically safe printed circuit board defect
10	Cable, trunking, conduit	20	Intrinsically safe circuit defect, e.g. invasion of power circuit, point to point screen defect

ELECTRICAL INSTALLATION TEST RESULTS

Site:	Building:

Installation Test Results

Distribution Board Details:	
DB Reference Number	
Location	
Z_s at DB(Ω)	
I_{pf} at DB (kA)	
Correct Supply Polarity Confirmed? ☐	
Phase Sequence Confirmed (Where Appropriate)? ☐	

Details of test instruments used:	
Serial / Asset Number	
Continuity	
Insulation Resistance	
Earth Fault Loop Impedance	
RCD	
Earth Electrode Resistance	
Impedance Measured	

Tested by:	
Name (Block Capitals)	
Signature	
Date (DD/MM/YYYY)	

Site:	Building:

Installation Test Results

Circuit Number & Phase	Circuit Description	Type of wiring	Conductor Details			Max disconnection time permitted (s)	Overcurrent Device(s)				RCD	
			Reference* Method	Live (mm^2)	CPC (mm^2)		BS EN	Type No	Rating (A)	Breaking capacity (kA)	Operating current I_n (mA)	Max Z_s permitted by BS7671 (Ω)

*See Table 4A2 of Appendix 4 of BS7671

Codes For Type of Wiring								
A	B	C	D	E	F	G	H	O (Other – please state)
Exposed PVC/ PVC cables prohibited	PVC cables in metallic conduit	PVC cables in non-metallic conduit	PVC cables in metallic trunking	PVC cables in non-metallic trunking	Exposed PVC/ SWA cables prohibited	XLPE/SWA Armoured cables	Mineral Insulated on cable tray	

Tested by:	
Name (Block Capitals)	
Signature	
Date (DD/MM/YYYY)	

Site:	Building:

Installation Test Results

Circuit Number & Phase	Circuit Impedances (Ω)					Insulation Resistance				Separation of Circuits (S or N/S)	Polarity (S or N/S)	Earth Electrode Resistance	Maximum measured earth fault loop impedance Z_s (Ω)	RCD Operating Times		
	All Circuits		Ring final circuits only			Line / Line (MΩ)	Line / Neutral (MΩ)	Line / Earth (MΩ)	Neutral / Earth (MΩ)					At 50% I_n (s or N/S)	At In (ms)	At 5 In (ms)
	R_1+R_2*	R_2	R_1	R_n	R_2											

* Where there are no spurs connected to a ring final circuit this value is also the (R_1+R_2) of the circuit

Tested by:	
Name (Block Capitals)	
Signature	
Date (DD/MM/YYYY)	

REMEDIAL ACTIONS ARISING FROM GENERIC SCHEDULE OF TEST RESULTS

Site:		Building:		
OBSERVATION	**CLASSIFICATION CODE**	**RECOMMENDED REMEDIAL ACTION**	**Complete By**	**Date of Action Completed**

Inspected by:

Name (Capitals)

Signature

Date

Classification Codes
Each observation relating to a concern about the safety of the installation shall be attributed an appropriate Classification Code selected from the standard codes C1, C2 and C3 as follows:

Code C1 'Danger present' Risk of injury. Immediate remedial action required
Code C2 'Potentially dangerous' Urgent remedial action required
Code C3 'Improvement recommended'
Code FI 'The inspector cannot determine any inspection item or test result is in a satisfactory condition for the installation to be safe for continued use

CERTIFICATE OF ELECTRICAL INSPECTION AND TESTING FOR ENFORCEMENT PURPOSES

CERTIFICATE OF ELECTRICAL INSPECTION AND TESTING AT MECHANICAL TRANSPORT FUELLING INSTALLATION FOR NEW INSTALLATIONS AND PERIODIC INSPECTIONS OF EXISTING INSTALLATIONS IN AND ASSOCIATED WITH POTENTIALLY FLAMMABLE ATMOSPHERES HEALTH AND SAFETY AT WORK ETC. ACT 1974. ELECTRICITY AT WORK REGULATIONS 1989. DANGEROUS SUBSTANCES AND EXPLOSIVE ATMOSPHERES REGULATIONS 2002

DETAILS OF THE SITE OPERATOR

Name of site operator	
Business name	
Address of MTFI	Postcode

DETAILS OFTHE INSPECTION AND TESTING

Date of the inspection and test		
Age of electrical installation		years (approximate if relevant records are not available)

INSTALLATION STATUS

Type of site	Type of verification	Availability of records	Verification programme
New site or major refurbishment	Pre-commissioning	Certification of design and construction, design drawings and circuit diagrams available	1
	Initial verification		2
Existing site	Periodic verification	Site electrical records available	3
		Site electrical records not available	4

CERTIFICATION STATEMENT

I declare I am competent to sign this certificate and I hereby certify that the electrical installation in the above premises operated for the storage, use and dispensing of petroleum spirit and autogas has been inspected and tested in accordance with verification programme(s) [ ] of APEA/EI *Design, construction, modification, maintenance and decommissioning of filling stations.* The classification awarded is:

•Delete as appropriate

"A SATISFACTORY as far as could be ascertained.

*B SUITABLE FOR CONTINUED USE subject to defects being remedied before the date(s) shown on the accompanying Inspection and Test Report.

*C UNSATISFACTORY, defects observed is of a dangerous nature and requires immediate attention. The presence of the recorded defects could make the site operator or their agent liable to prosecution.

The Classification awarded relates to the classification of the worst defect observed.
For Classification B and C the Defect Report should be completed.

This certificate relates to:

Inventory checklist no		Dated		Inspection and test report no		Dated	
Initial assessment no		Dated					

Signature of person carrying out the inspection (Note 1)		Full name (CAPITALS)		Dated	
Position		Qualifications			
Company name and address					

NOTES
1. It is an offence under Section 33 of the Health and Safety at Work etc. Act 1974 for any person to make a false entry on this certificate.
2. The person carrying out the inspection and testing must be competent, be fully conversant with BS7671 - *Requirements for electrical installations* and the particular requirements for hazardous area zones in MTFIs and have practical experience with the relevant parts of EN 60079 *Explosive atmospheres*

All persons completing and signing the certificate are reminded of the legal requirements for competence contained in Regulation 16 of the statutory Electricity at Work Regulations. The defects to be recorded on the Defect Report are those relating to failure to meet Statutory requirements. Non-compliances relating to other items should only be recorded on the MTFI Electrical Periodic Inspection Report together with the defects shown in the Defect Report

DEFECT REPORT FOR AN ELECTRICAL INSTALLATION AT A MTFI FOR ENFORCEMENT PURPOSES

This report must accompany a certificate of electrical inspection and testing where defects relate to statutory requirements

Item	Description of defect	Classification*	Remedial action	Remedial action required by (date)

*Guidance on classifications of defects is given in 14.10.4 of APEA/EI *Design, construction, modification, maintenance and decommissioning of filling stations*

MECHANICAL TRANSPORT FUELLING INSTALLATION ELECTRICAL CONDITION REPORT
(Not for statutory enforcement purposes)

A DETAILS OF THE SITE OPERATOR

Name of the operator	
Trading Title	
Address of filling station	Telephone No Postcode

B CLASSIFICATION AND CERTIFICATION OF SITE

I/We being the person(s) responsible for the inspection and testing of the electrical installation (as indicated by my/our signatures below) particulars of which are described above (see A) having exercised reasonable skill and care when carrying out the inspection and testing, hereby declare that the information in this report, including the observations (see Gland the attached schedules provide an accurate assessment of the condition of the electrical installation taking into account the stated extent of the installation (see D) and the limitations of the inspection and testing (see E). The inspection and testing has been performed in accordance with EN 60079 and BS 7671, amended to (date) and the recommendations given in the APEA/EI guidance.

I/We further declare that in my/our judgement the said installation was overall in * condition (see G) at the time the inspection was carried out and that it should be further inspected as recommended (see F).

** (Insert **'a satisfactory'** or **'an unsatisfactory',** as appropriate)*

Inspection, testing and assessment by			**Reviewed by**		
Signature		Inspector	Signature		Supervisor
Name (CAPITALS			Name (CAPITALS		
Position					
DATE			DATE		

Contractor responsible for the work which is the subject of this certificate (trading title)			
Trading address		Telephone no	

C PURPOSE OF THE REPORT

Purpose for which this report is required	

D EXTENT OF THE INSTALLATION

Extent of the electrical installation covered by this report	

E LIMITATIONS OF INSPECTION AND TESTING

Agreed Limitations, if any, on the inspection and testing	

F NEXT INSPECTION

I/We recommend that this installation is further inspected and tested after an interval of not more than

(Enter interval in terms of years or months, as appropriate)

G	OBSERVATIONS AND RECOMMENDATIONS FOR ACTIONS TO BE TAKEN		
Item No		Code (A, B or C)	Remedial action required by (date)

Urgent remedial work recommended for Items

Corrective action(s) recommended for Items

Note: Items coded 'B' and 'C' are also recorded on the defect report

H	SITE DOCUMENTS		
	The inspector is required to confirm that all applicable related reference documents have been recorded	Serial No	Date
	Electrical Installation Completion Certificate		
	Previous MTFI Electrical Periodic Reports		
	Site plan		
	Earth rod layout drawing		
	Inventory of electrical equipment		
	Hazardous area classification document		

I	TEST INSTRUMENTS USED		
Test Instrument	Manufacturer	Model	Serial No
Earth fault loop impedance			
Insulation resistance			
Earth electrode resistance test instrument			
Earthing leakage clamp ammeter			
RCD			
Continuity			
Other			

J SUPPLY CHARACTARISTICS AND MAIN SWITCH

Tick boxes and enter details as appropriate

System Type	IT		TN-S		Local TN-S		TN-C-S	
Number and type of conductors	1 phase, 2 wire		3 Phase, 4 wire		Other		Please state	
Nature of supply parameters	Nominal Voltage $U^{(1)}$	V	Normal Frequency	Hz	Prospective Fault Current$^{(2)(3)}$	kA	External $Z_e{}^{(2)(3)}$	Ω
	$U_0{}^{(1)}$	V					No of Supplies	
Characteristic of primary supply overcurrent protective device	BS EN		Type		Nominal current rating	A	Short Circuit Capacity	kA
Main Switch or circuit breaker	BS EN		No of Poles		Supply conductor material		Supply conductor CSA	Mm^2
	Voltage Rating	V	Current Rating	A	RCD rated residual operating current	mA	RCD Operating time at residual operating current	ms
Rated fault current of forecourt switchgear		kA						

(1) by enquiry (2)by measurement, (3) where more than one supply, record highest

K TEST PERFORMANCE AT INTAKE POSITION

† See note below

				Measured Value	Acceptable Max/Min values
Earth fault loop impedance (phase to earth) measured at (tick one) test socket-outlet		Or at origin (no test socket)			
Prospective fault current (tick one)	p-n		p-e		kA
Current measured in earthing conductor under normal conditions				A	A
Combined resistance of earth electrode arrangement (where measured)			R_A	Ω	Ω
Operating times of residual current device (RCD) at $I_{\Delta n}$ and at $5I_{\Delta n}$ (if applicable)			I_Δ	ms	ms
			$5I_\Delta$	ms	ms

	The test socket-outlet is adjacent to the origin of the filling station installation (located in a non-hazardous area)
	The test socket-outlet has the correct isolation and protection
	Main Earthing Terminal test link is labelled
	Main equipotential bonding checked
Ground conditions	

L FUNCTIONAL CHECKS † See note below

	Publicly-accessible emergency switching devices (where fitted) function correctly and are installed at the correct height		All emergency stop switches are correctly labelled and have red operators on yellow background		Driver Controlled Delivery emergency stop switch functions correctly
	Operator-controlled emergency switching devices function correctly		An emergency stop switch is provided at every operating position		Firefighter's switch is at the correct height and functions correctly
	The emergency switch circuit cannot be re-energized other than by an authorised person		An emergency stop switch is provided at each exit of the autogas compound		The public address (PA) system is operating correctly and is not disabled by the pump emergency stop system
			The autogas emergency stop switch(es) functions correctly		The tanker stand lighting is functioning correctly

† **All boxes must be completed**. '✓' Indicates that an inspection or a test was carried out and that the result was **satisfactory**. '**X**' indicates that an inspection or a test was carried out and that the result was **unsatisfactory 'N/A'** indicates that an inspection or a test was not applicable to the particular installation. **'LIM'** indicates that, exceptionally, a **limitation** agreed with the person ordering the work (as recorded in Section E) **prevented** the inspection or test being carried out.

M	CHECKLIST FOR INSPECTION OF AN ELECTRICAL INSTALLATIONM			† See note below	
	1. Presence of records, diagrams and schedule information		21. Integrity of ducts, ducting, trenches, piping, access chambers etc. for fuel in both liquid and gaseous forms		d appropriate apparatus group or subgroup
	2. Electrical characteristics at the origin		22. Presence of signs, labels and other warning notices		e correct circuit identification
	3. Earthing connections and bonding		23. Lighting (e.g. enclosures and seals)		f maintenance of integrity of enclosures
	4. Presence of test earth fault loop impedance socket-outlet adjacent to supply intake {non-hazardous areal		24. Serviceable lamps of correct types and ratings		g cable glands, entries and stoppers etc. complete and appropriate to the enclosure
	5. Presence of lightning protection		25. Apparatus is suitable for environment and correctly labelled		h integrity of electrical connections
	6. Methods of protection against direct and indirect contact		26. Damage to apparatus or wiring systems which might impair safety		i satisfactory earthing, bonding etc.
	7. Main switchboard and distribution boards - circuit identification		27. No unauthorised or unrecorded modifications/repairs including 'add-ons'		j correct rating of apparatus and components
	8. Labelling of circuits, protective devices, switches and terminals		28. No overhead tines (e.g. HV and IV power and telephone lines) over or encroaching on hazardous areas		k adequate environmental protection, e.g. against weather, mechanical damage
	9. Presence of appropriate devices for secure isolation and switching		29. No part of the hazardous area extends beyond the forecourt perimeter (including the zone around vent pipes)		37. Details of other items of non-compliance
	10. Isolating devices capable of being locked in the 'off position		30. No building opening extends into the hazardous area (including the zone around vent pipes)		38. No indication of fuel, oil or compound leakage
	11. Choice and setting of protective and monitoring devices		31. The zone around the vent pipes is free from electrical equipment including cables		39. No corrosion of enclosures, fixings, cable entries etc.
	12. Correct connection of socket-outlets, lamp holders and other accessories		32. Suitability of residual current device (RCD) protection		40. No undue accumulation of dust, dirt or rubbish (leaves, paper etc.)
	13. Single pole devices for protection or switching in phase conductors only		33. There is no equipment which may influence the hazardous area by, for example, displacing and /or ingesting air out of, or into, the hazardous area		41. No loose electrical connections, including those for earthing, bonding etc.
	14. All have conductors (including neutral) are switched and isolated for hazardous area circuits, including emergency switching		34. RCD protection has been provided for dispensers		42. No loose fixings, glands, conduit stoppers etc,
	15. Ancillary equipment- luminares, socket-outlets, portable and transportable equipment		35. The location and adequacy of the tanker stand lighting is correct		43. No wear or undue running noise of pump motor bearings (external Check only. e.g.- lateral movement of shaft or signs of overheating}
	16. Selection ol equipment and protective measures appropriate to external influences		36. Additional checks for all hazardous area equipment and components (this does not refer only to dispensers):		44. No inadvertent contact between moving and fixed parts
	17. Identification and connection of conductors				45. Integrity of guards
	18. Selection of wiring systems and conductors for current-carrying capacity and voltage drop		a nameplate details - accredited certification mark, certificate standard number		46. Maintenance appears adequate (as per manufacturer's recommendations) and properly documented
	19. Cables routed correctly		b explosion protection suitable for zone of installation		47. Accessible and impervious seals in ducts / ducting / pipes
	20. Presence of fire barriers and protection against thermal effects		c correct temperature classification		

† **All boxes must be completed**. '✓' Indicates that an inspection or a test was carried out and that the result was **satisfactory**. '**X**' indicates that an inspection or a test was carried out and that the result was **unsatisfactory 'N/A'** indicates that an inspection or a test was not applicable to the particular installation. **'LIM'** indicates that, exceptionally, a **limitation** agreed with the person ordering the work (as recorded in Section E) **prevented** the inspection or test being carried out.

N HAZARDOUS AREA CIRCUIT DETAILS	*Tick boxes and enter details, as appropriate.*																												
Circuit description (Such as dispenser or submersible pump)			Circuit conductors csa		Overcurrent protective devices				RCD		Lowest Insulation resistance			Equipment Serial Numbers															
	1φ or 3φ	Wiring type	Live (mm²)	Cpc or sheath (mm²)	BS (EN)	Type	Rating (A)	Short-circuit capacity (kA)	Operating current I_Δ (mA)	Operating time I_Δ (ms)	Line/Earth (MΩ)	Neutral/Earth (MΩ)	Leakage current (mA)		Fuel Type (Petrol, Diesel, AutogGas)	No of Nozzles	Certification (i) EN 13617, (ii) BS7117, (iii) SFA 3002	Type of Ex Protection of junction box eg Exd Exe	Type of Ex Protection of cable gland eg Exd Exe	Suitability of apparatus for zone	Visual condition of enclosures	Condition of gaskets, stoppers, fastenings	Integrity of connections	IP rating of enclosures	No contact between fixed& moving parts	No undue noise / vibration from motor / bearing	Low Ω continuity (wander lead method)	No visual damage or unauthorised modifications	Classification (A, B or C)

All boxes must be completed. '✓' Indicates that an inspection or a test was carried out and that the result was **satisfactory**. '**X**' indicates that an inspection or a test was carried out and that the result was **unsatisfactory** **'N/A'** indicates that an inspection or a test was not applicable to the particular installation. **'LIM'** indicates that, exceptionally, a **limitation** agreed with the person ordering the work (as recorded in Section E) **prevented** the inspection or test being carried out.

F	G	H										
PVC/SWA cables	XLPE/SWA Cables	Mineral Insulated Cables										