
Overview

This standard is for people who inspect and test electrical systems and equipment

The person carrying out this work must be able to comply with the processes and procedures for initial and periodic inspection and testing of an electrical system in accordance with the current versions of the appropriate industry standards and regulations, the specification, industry recognised working practices, the working environment and the natural environment.

They must know, understand and apply the correct methods and procedures for the inspection and testing of electrical systems and equipment, including the:

- identification and use of the correct instruments
- completion of the relevant documentation
- recording of relevant data and information.

Please note that industry specific terminology is identified by *italic* text and its explanation and/or definition can be found in the glossary of this standard.

SUMET06

Inspect and test electrical systems and equipment (SQA Unit
Code H953 04)



**Performance
criteria**

To carry out this work in accordance with the current versions of *the appropriate industry standards and regulations, the specification, working practices, the working environment and the natural environment*

- You must be able to:**
- P1 confirm a programme of work with the **relevant people** in accordance with **organisational procedures**
 - P2 determine and obtain the **resources** required, as relevant, to undertake:
 - P2.1 initial inspection and testing
 - P2.2 periodic inspection and testing
 - P3 select the instruments to be used for carrying out the relevant **tests**
 - P4 confirm that the instruments are fit for purpose and have a current calibration certificate
 - P5 conduct a visual inspection on the **enclosures for cables, conductors and wiring systems** to confirm they are:
 - P5.1 located and secured correctly
 - P5.2 electronically and mechanically sound
 - P6 conduct a visual inspection on the **electrical cable, conductor and wiring systems** to confirm they are:
 - P6.1 located and secured correctly
 - P6.2 identified and/or labelled correctly
 - P7 conduct a visual inspection on the **equipment, accessories and components** to confirm they are:
 - P7.1 located and secured correctly
 - P7.2 identified and/or labelled correctly
 - P8 comply with industry practices and **organisational procedures** to ensure the co-ordination of **site services** and the activities of other trades affected by:
 - P8.1 the inspection process and procedures
 - P8.2 the testing process and procedures
 - P9 identify the correct means of electrical isolation prior to commencing the inspection and/or testing process
 - P10 complete safe-isolation as and when required to ensure the safe inspection and testing of **electrical cables, conductors and/or wiring system** and the associated **equipment, accessories and components**

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- P11 perform the **tests** in the correct sequence that ensure safe and efficient operation of the **electrical system**
 - P12 comply with **organisational procedures** for:
 - completion of the relevant **documentation**
 - P12.2 the recording of relevant data and information
 - P12.3 informing **relevant people**
 - P12.4 addressing issues and problems identified

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Knowledge and understanding

To carry out this work in accordance with the current versions of *the appropriate industry standards and regulations, the specification, working practices, the working environment and the natural environment*

You need to know and understand:

- K1 the operation, applications, advantages and limitations of different **electrical systems**
- K2 the **organisational procedures** to confirm a programme of work with the **relevant people**
- K3 how to determine and obtain the **resources** required, as relevant, to undertake:
 - K3.1 initial inspection and testing
 - K3.2 periodic inspection and testing
- K4 how to select the instruments to be used for carrying out relevant **tests**
- K5 how to confirm that the test instruments are fit for purpose and have a current calibration certificate
- K5 the methods and procedures for conducting a visual inspection on the **enclosures for cables, conductors and wiring systems** to confirm they are:
 - K5.1 located and secured correctly
 - K5.2 electrically and mechanically sound
- K6 the methods and procedures for conducting a visual inspection on the **electrical cable, conductor and wiring systems** to confirm they are:
 - K6.1 located and secured correctly
 - K6.2 identified and/or labelled correctly
- K7 the methods and procedures for conducting a visual inspection on the **equipment, accessories and components** to confirm they are:
 - K7.1 located and secured correctly
 - K7.2 identified and/or labelled correctly
- K8 the industry practices and **organisational procedures** to ensure the co-ordination of **site services** and the activities of other trades affected by:
 - K8.1 the inspection process and procedures
 - K8.2 the testing process and procedures
- K9 the correct procedures for safe-isolation

K10 the methods and processes to carry out correctly the **tests** that ensure safe and efficient operation of the **electrical system**

K11 the **organisational procedures** for:

K11.1 completion of the relevant **documentation**

K11.2 the recording of relevant data and information

K11.3 informing **relevant people**

K11.4 addressing issues and problems identified

Additional information**Scope related to
performance criteria**

The contexts and circumstances below identify where and when the NOS could apply.

1 Working environments (internal and/or external)

- 1.1 commercial
- 1.2 industrial
- 1.3 domestic
- 1.4 agricultural
- 1.5 horticultural
- 1.6 leisure and entertainment
- 1.7 residential medical and care facilities
- 1.8 public highways and parks
- 1.9 *public services establishments*
- 1.10 pre 1919 traditional/historic buildings

2 Electrical system

An electrical system, internal and/or external, in a building and/or structure that has an extra low voltage and/or low voltage single and/or multi-phase supply, circuits, equipment and components to provide:

- 2.1 control
- 2.2 communication
- 2.3 heating
- 2.4 lighting
- 2.5 power

3 Organisation procedures

- 3.1 information management
- 3.2 project management
- 3.3 risk assessment
- 3.4 risk management
- 3.5 implementing and monitoring health and safety requirements and issues
- 3.6 implementing and monitoring issues relating to the *natural environment*

3.7 customer services

3.8 accident reporting

3.9 emergencies

3.10 communication with relevant people

4 Resources

4.1 labour

4.2 plant and equipment

4.3 instruments

4.4 finance

4.5 IT

4.6 materials and other consumables

5 Site services

5.1 electricity

5.2 water

5.3 gas

5.4 oil

5.5 drainage

5.6 telecommunications

5.7 data transmission either underground or overhead

**Range related to
performance criteria****The contexts and circumstances below identify where and when the NOS
must apply****1 Relevant people**

- 1.1 *customers/clients*
- 1.2 client representatives
- 1.3 supervisors
- 1.4 site/contract manager
- 1.5 other contractors/trades
- 1.6 members of the public
- 1.7 work colleagues

2 Tests

- 2.1 continuity
- 2.2 insulation resistance
- 2.3 polarity
- 2.4 earth fault loop impedance
- 2.5 prospective fault current
- 2.6 RCD operation
- 2.7 functional testing

3 Enclosures for cables, conductors and wiring systems

- 3.1 PVC and steel conduit
- 3.2 PVC and steel trunking
- 3.3 cable tray
- 3.4 basket and ladder systems
- 3.5 ducting systems
- 3.6 bus-bar trunking
- 3.7 pre-fabricated conductor, cable and wiring systems

4 Electrical cable, conductors and wiring systems

- 4.1 thermosetting insulated cables including flexes
- 4.2 single and multicore thermoplastic and thermosetting insulated cables
- 4.3 flat profile cable

- 4.4 mineral insulated cables
- 4.5 single wire armoured cables
- 4.6 armoured/braided flexible cables and cords
- 4.7 data cables
- 4.8 pre-fabricated conductor, cable and wiring systems
- 4.9 fibre optic cable
- 4.10 fire resistant cable
- 4.11 bus-bar trunking

5 Equipment, accessories and components

- 5.1 consumer units
- 5.2 distribution boards and/or panels
- 5.3 isolators
- 5.4 circuit breakers
- 5.5 fuses
- 5.6 switches
- 5.7 socket-outlets
- 5.8 earthing protection
- 5.9 luminaries
- 5.10 motor control equipment
- 5.11 control panels – alarms; emergency lighting; environmental control
- 5.12 control devices – electrical; electronic; electro-mechanical
- 5.13 solar photovoltaic panels – control equipment, components and accessories
- 5.14 micro-wind turbine control equipment
- 5.15 cable glands

6 Documentation

- 6.1 electrical installation certificates
- 6.2 electrical installation condition reports
- 6.3 minor electrical installation works certificates
- 6.4 schedules of inspections
- 6.5 schedules of test results

**Scope related to
knowledge and
understanding****The contexts and circumstances below identify where and when the NOS
could apply****1 Working environments** (internal and/or external)

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- 1.2 industrial
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- 3.6 implementing and monitoring issues relating to the *natural environment*
- 3.7 customer services
- 3.8 accident reporting

3.9 emergencies

3.10 communication with relevant people

4 Resources

4.1 labour

4.2 plant and equipment

4.3 instruments

4.4 finance

4.5 IT

4.6 materials and other consumables

5 Site services

5.1 electricity

5.2 water

5.3 gas

5.4 oil

5.5 drainage

5.6 telecommunications

5.7 data transmission either underground or overhead

**Range related to
knowledge and
understanding**

The contexts and circumstances below identify where and when the NOS must apply

1 Relevant people

- 1.1 *customers/clients*
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- 5.12 control devices – electrical; electronic; electro-mechanical
- 5.13 solar photovoltaic panels – control equipment, components and accessories
- 5.14 micro-wind turbine control equipment
- 5.15 cable glands

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- 6.3 minor electrical installation works certificates
- 6.4 schedules of inspections
- 6.5 schedules of test results

Glossary**Appropriate industry standards and regulations for:**

- electricity at work
- the quality of buildings and building work in England, Northern Ireland, Scotland and Wales
- requirements for electrical installations
- electricity safety, quality and continuity
- working at heights managing health and safety at work
- workplace health and safety and welfare
- personal protection at work
- provision and use of work equipment
- manual handling operations
- construction design and management
- controlling noise at work
- controlling asbestos in the work place
- controlling substances hazardous to health
- recycling and disposal of waste electrical and electronic equipment

Specification

A verbal and/or documented instruction that is an explicit set of requirements for installing, maintaining and/or servicing identified systems, equipment or products, to be satisfied by materials, components, design, processes, procedures, data management and/or service(s).

Clients/customers

- purchaser of installation and/or maintenance services
- other trades and services at the work site
- colleagues within the same organisation
- architect
- contract manager
- main/sub-contractor
- consultant
- local authority representatives
- work colleagues

A **public services establishment** can be a:

- hospital/medical centre
- school/college/university
- museum/library
- prison
- military base
- car park
- church or other place of worship

Natural environment

The climate, weather and natural resources that effect and are affected by human life and economic activity

Working practices

Methods, techniques and procedures that are adopted for carrying out specific tasks that ensures workers' exposure to hazardous situations is controlled in a safe manner when:

- working with equipment, tools and plant
- working with materials and substances (hazardous and non-hazardous)
- manual handling lifting
- using lifting equipment
- using personal protective equipment (PPE)

Personal protective equipment (PPE)

- safety helmets/hats
- hairnets
- gloves
- safety steel toe capped boots/shoes
- safety spectacles/goggles
- face shields/visors
- ear plugs/muffs
- conventional or disposable overalls, boiler /chemical suits, aprons

- respiratory protective equipment (RPE)
- high visibility clothing

Links to other NOS

SUMETS1 Plan, prepare and install environmental technology systems

SUMETS7 Service and maintain environmental technology systems

SUMETS10 Inspect and commission environmental technology systems

SUMETS11 Diagnose and rectify faults in environmental technology systems

External Links

Links correct at time of NOS approval:

- Health & Safety Executive Documents <http://www.hse.gov.uk/pubns>
- The quality of buildings and building work in England
<https://www.gov.uk/government/policies/providing-effective-building-regulations-so-that-new-and-altered-buildings-are-safe-accessible-and-efficient>
- The quality of buildings and building work in Wales
<http://wales.gov.uk/topics/planning/buildingregs/?lang=en>
- The quality of buildings and building work in Northern Ireland
<http://www.dfpni.gov.uk/building-regulations>
- The quality of buildings and building work in Scotland
<http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards>
- British Standard 7671 – Requirements for Electrical Installations
<http://www.theiet.org/resources/wiring-regulations/>
- Carriage of dangerous goods authorisations
<https://www.gov.uk/government/publications/carriage-of-dangerous-goods-authorisations>
- The requirements and information on microgeneration
<https://www.gov.uk/government/publications/microgeneration-strategy>

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Originating organisation	SummitSkills
Original URN	ELT24/25
Relevant occupations	Highway Electrical Systems Installer; Installation Electrician; Maintenance Electrician; Electrical Trades; Electrician; Highway Electrical Systems Commissioning Electrician; Highway Electrical Systems Service & Maintenance Electrician; Industrial and Commercial Systems Engineer
Suite	Electrotechnical
Key words	Inspect; test; electrical systems and equipment; standards; regulations; specification; working environment; natural environment; electrical; electrotechnical