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**Overview**

This standard is for people who identify and rectify faults in electrical systems and equipment

The person carrying out this work must be able to carry out the processes and procedures for the identification and rectification of faults 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 understand and apply the correct methods and procedures when identifying and rectifying faults in electrical systems and equipment, including:

- the identification and use of the correct instruments
- how to identify and locate faults
- how to rectify the faults that are identified, located and diagnosed
- the completion of the relevant documentation
- the 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.

**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 obtain clear and detailed information about the reported fault(s) and any components which need to be replaced from relevant:
    - P1.1 sources of **information**
    - P1.2 **documentation**
  - P2 advise the **relevant people** clearly and accurately about the potential disruption and consequences of carrying out the processes and procedures for the identification and rectification of faults
  - P3 confirm a programme of work with the **relevant people** in accordance with **organisational procedures**
  - P4 determine and obtain the **resources** required, as relevant, to undertake:
    - P4.1 the identification and location of the fault(s)
    - P4.2 the rectification of the fault(s)
  - P5 select the instruments to be used
  - P6 confirm that the instruments are fit for purpose and have a current calibration certificate
  - P7 identify the correct means of electrical isolation prior to commencing the fault identification and rectification process
  - P8 complete safe-isolation as and when required to ensure the safe fault identification and rectification in **electrical cables, conductors and/or wiring system** and the associated **equipment, accessories and components**
  - P9 comply with industry practices and **organisational procedures** to ensure the co-ordination of **site services** and the activities of other trades affected by:
    - P9.1 the identification and location of the fault(s)
    - P9.2 the rectification of the fault(s)
  - P10 identify, locate, diagnose and rectify faults
  - P11 repair, remove and replace in accordance with industry recognised methods and procedures, as appropriate:
    - P11.1 **electrical cables, conductors and/or wiring system**
    - P11.2 **equipment, accessories and components**

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- P12 ensure, if the fault(s) cannot be corrected immediately, the safety of the relevant:
- P12.1 **electrical cables, conductors and/or wiring system**
  - P12.2 **equipment, accessories and components**
- P13 inspect and test, as appropriate and in accordance with industry recognised methods and practices the repaired and/or replaced:
- P13.1 **electrical cables, conductors and/or wiring system**
  - P13.2 **equipment, accessories and components**
- P14 provide clear and accurate **information to relevant people** about the **electrical system** and **equipment** in terms of:
- P14.1 hand over to the *customer/client*
  - P14.2 any variations to the original system and/or its equipment
  - P14.3 *customer/client* acceptance of the completed work in accordance with **organisational procedures**
  - P14.4 relevant **documentation** being completed and recorded in the appropriate **information** systems in accordance with **organisational procedures**

### 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 how to obtain clear and detailed information about the reported fault(s) and any components which need to be replaced from:
  - K2.1 relevant sources of **information**
  - K2.2 relevant **documentation**
- K3 the **organisational procedures** and industry practices when carrying out the processes for the identification and rectification of faults for:
  - K3.1 advising the **relevant people** about the potential disruption and consequences
  - K3.2 confirming a programme of work with the **relevant people**
  - K3.3 ensuring the coordination of **site services** and the activities of other trades affected
- K4 how to determine and obtain the **resources** required, as relevant, to undertake:
  - K4.1 the identification and location of the fault(s)
  - K4.2 the rectification of the fault(s)
- K5 how to select the instruments to be used
- K6 how to confirm that the instruments are fit for purpose and have a current calibration certificate
- K7 the correct procedures for safe-isolation
- K8 the techniques to identify, locate, diagnose and rectify faults
- K9 how to repair, remove and replace in accordance with industry practices, as appropriate:
  - K9.1 **electrical cables, conductors and/or wiring system**
  - K9.2 **equipment, accessories and components**
- K10 how to ensure, if the fault(s) cannot be corrected immediately, the safety of the relevant:
  - K10.1 **electrical cables, conductors and/or wiring system**
  - K10.2 **equipment, accessories and components**

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- K11 the methods and processes to inspect and test, as appropriate and in accordance with industry practices, the repaired and/or replaced:
- K11.11 **electrical cables, conductors and/or wiring system**
  - K11.12 **equipment, accessories and components**
- K12 how to provide clear and accurate **information** to **relevant people** about the **electrical system** and **equipment** in terms of:
- K12.1 hand over to the *customer/client*
  - K12.2 any variations to the original system and/or its equipment
  - K12.3 *customer/client* acceptance of the completed work in accordance with **organisational procedures**
  - K12.4 relevant **documentation** being completed and recorded in the appropriate **information** systems in accordance with **organisational procedures**

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**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 Organisational procedures**

- 3.1 information management
- 3.2 method statement
- 3.3 project management
- 3.4 risk assessment
- 3.5 risk management
- 3.6 implementing and monitoring health and safety requirements and issues

3.7 implementing and monitoring issues relating to the *natural environment*

3.8 customer services

3.9 accident reporting

3.10 emergencies

3.11 communication with *customers/clients*, and stakeholders

#### 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

#### 6 **Information**

6.1 technical – design documentation; plans; installation specifications; equipment specifications; manufacturers' data; manufacturers' instructions; BIM data

6.2 functional – operational instructions

6.3 *customer/client* information – drawings; diagrams; user instructions; specifications

6.4 contractual

6.5 statutory consents

6.6 health and safety

6.7 environmental considerations

**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 Enclosures for cables, conductors and wiring systems**

- 2.1 PVC and steel conduit
- 2.2 PVC and steel trunking
- 2.3 cable tray
- 2.4 basket and ladder systems
- 2.5 ducting systems
- 2.6 bus-bar trunking
- 2.7 pre-fabricated conductor, cable and wiring systems

**3 Electrical cable, conductors and wiring systems**

- 3.1 thermosetting insulated cables including flexes
- 3.2 single and multicore thermoplastic and thermosetting insulated cables
- 3.3 flat profile cable
- 3.4 mineral insulated cables
- 3.5 single wire armoured cables
- 3.6 armoured/braided flexible cables and cords
- 3.7 data cables
- 3.8 pre-fabricated conductor, cable and wiring systems
- 3.9 fibre optic cable
- 3.10 fire resistant cable
- 3.11 bus-bar trunking



#### **4 Equipment, accessories and components**

4.1 consumer units

4.2 distribution boards and/or panels

4.3 isolators

4.4 circuit breakers

4.4 fuses

4.6 switches

4.7 socket-outlets

4.8 earthing protection

4.9 luminaries

4.10 motor control equipment

4.11 control panels – alarms; emergency lighting; environmental control

4.12 control devices – electrical; electronic; electro-mechanical

4.13 solar photovoltaic panels – control equipment, components and accessories

4.14 micro-wind turbine control equipment

4.15 cable glands

#### **5 Documentation**

5.1 electrical installation certificates

5.2 electrical installation condition report

5.3 minor electrical installation works certificates

5.5 schedules of inspections

5.5 schedules of test results

5.6 operational instructions

5.7 manufacturers' instructions

5.8 handover agreements

**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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- 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

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**Range related to  
knowledge and  
understanding**

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

**1 Relevant people**

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- 3.10 fire resistant cable
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#### **4 Equipment, accessories and components**

- 4.1 consumer units
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- 4.3 isolators
- 4.4 circuit breakers
- 4.4 fuses
- 4.6 switches
- 4.7 socket-outlets
- 4.8 earthing protection
- 4.9 luminaries
- 4.10 motor control equipment
- 4.11 control panels – alarms; emergency lighting; environmental control
- 4.12 control devices – electrical; electronic; electro-mechanical
- 4.13 solar photovoltaic panels – control equipment, components and accessories
- 4.14 micro-wind turbine control equipment
- 4.15 cable glands

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- 5.1 electrical installation certificates
- 5.2 electrical installation condition report
- 5.3 minor electrical installation works certificates
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**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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<b>Status</b>	Original draft
<b>Originating organisation</b>	SummitSkills
<b>Original URN</b>	EL27/28
<b>Relevant occupations</b>	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
<b>Suite</b>	Electrotechnical
<b>Key words</b>	Identify and rectify faults; electrical systems and equipment; industry standards; regulations; specification; working environment; natural environment; faults; electrical; electrotechnical