

Overview

This standard is for people who are required to carry out work on electrical supplies and/or circuits for the control of mechanical building services systems which:

- does not require the addition of a circuit to the existing fixed electrical installation
- will only be associated with the disconnection, installation and/or connection of electrical equipment and components associated with the supply and/or control of mechanical services systems

The person performing this work must be able to comply with the correct procedures and practices for disconnecting, installing and/or connecting electrical equipment and components that supply and/or control mechanical building services systems. This work must be in accordance with the current versions of the appropriate industry standards and regulations, the specification, industry recognised working practices, the working and natural environment. It will not involve the testing and commissioning of the fixed electrical installation and its constituent parts. They must know and understand the types, applications and limitations of electrical supplies, isolation and control equipment, earthing and overcurrent protection and /cables/wiring associated with mechanical building services systems

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 perform 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 the presence or not of an **electrical supply**
- P2 confirm, as necessary, that the **electrical supply** is suitable for the **mechanical building services system**
- P3 produce a risk assessment and method statement for the work to be carried out, including the identification and use of *personal protective equipment*
- P4 verify that job information and documentation is current and relevant and that the **plant**, instruments, *access equipment* and tools are fit for purpose
- P5 select, as required, **electrical equipment, cables/wiring, accessories and components** and confirm that they are:
- P5.1 of the right type and size
- P5.2 fit for purpose in accordance with the **mechanical building services system's** design

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- P6 comply with industry practices and **organisational procedures** to ensure the co-ordination of **site services** and the activities of other trades
- P7 identify the correct means of electrical isolation prior to commencing disconnection, installation and/or connection work
- P8 complete safe-isolation as required to ensure the safe disconnection, installation and/or connection of **electrical equipment, cables/wiring, accessories and components** associated with the electrical supply and/or control of the **mechanical building services system**
- P9 disconnect, install and/or connect, as required, **electrical equipment, cables/wiring, accessories and components** associated with the electrical supply and/or control of the **mechanical building services system** in accordance with the requirements of:
- P9.1 industry recognised methods and procedures
 - P9.2 manufacturers' instructions
- P10 check, as necessary, that the **electrical equipment, cables/wiring, accessories and components** are of proper construction as regards to insulation, mechanical strength and protection, and ensure that they are identified correctly and clearly in accordance with the requirements of the **mechanical building services system**
- P11 undertake, as necessary, functional testing of the **electrical equipment, accessories and components** associated with the **electrical supply** and/or control of the **mechanical building services system** in accordance with:
- P11.1 industry recognised methods and procedures
 - P11.2 manufacturers' instructions
- P12 identify and rectify electrical faults in the **mechanical building services system** in accordance with:
- P12.1 industry recognised methods and procedures
 - P12.2 manufacturers' instructions
- P13 confirm with the **relevant people**:
- P13.1 those necessary variations to the planned programme of work
 - P13.2 the actions to be taken to ensure that any variations to the planned programme of work will minimise the potential for hazard and risk
- P14 implement **organisational procedures** for the safe transport and/or disposal of waste material, substances and liquids in accordance with supplier's and manufacturer's instructions

Knowledge and understanding

To perform 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 limitations of your responsibility when carrying out work on **electrical supplies** and/or circuits for the control of **mechanical building services systems**
- K2 the applications, advantages and limitations of **electrical supplies**
- K3 the applications, advantages and limitations of different **electrical equipment, cables/wiring, accessories and components** in relation to the **working environment**
- K4 the *appropriate industry standards and regulations* relevant to carrying out work on **electrical supplies** and/or circuits for the control of **mechanical building services systems**
- K5 how to verify that job information and documentation is current and relevant and that the **plant**, instruments, *access equipment* and tools are fit for purpose
- K6 how to produce a risk assessment and method statement for the work to be carried out, including the identification and use of *personal protective equipment*, in accordance with:
 - K6.1 the **mechanical building services system's** design
 - K6.2 the conditions of the **working environment**
 - K6.3 **organisational procedures**
- K7 the methods for selecting **electrical equipment, cables/wiring, accessories and components** to ensure that they are fit for purpose
- K8 how to interpret diagrams and drawings for the **mechanical building services system** to identify the location of the:
 - K8.1 **site services**
 - K8.2 **electrical equipment, accessories and components**
- K9 the methods and techniques for disconnecting, installing and/or connecting **electrical equipment, cables/wiring, accessories and components** in accordance with:
 - K12.11 the **mechanical building services system's** design
 - K12.12 manufacturers' instructions
- K10 the correct procedures for safe-isolation

- K11 industry recognised methods and procedures for the functional testing of the **electrical equipment, accessories and components** associated with the **electrical supply** and/or control of the **mechanical building services system**
- K12 how to identify and rectify electrical faults in the **mechanical building services system** in accordance with:
 - K12.1 industry recognised methods
 - K12.2 the limitations of your responsibility
- K12 the **organisational procedures** for confirming with the **relevant people** the appropriate actions to be taken to ensure that any variations to the planned programme of work will not introduce a hazard and have minimum negative impact on the installation work to be undertaken
- K13 the methods for the safe transport and/or disposal of waste material, substances and liquids in accordance with suppliers' and manufacturers' instructions

Additional information**Scope related to performance criteria**

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

1 Mechanical building services systems

- 1.1 air conditioning
- 1.2 domestic plumbing and heating
- 1.3 heating and ventilating
- 1.4 refrigeration

2 Working Environment (Internal and/or External)

- 2.1 commercial
- 2.2 industrial
- 2.3 domestic
- 2.4 agricultural
- 2.5 horticultural
- 2.6 leisure and entertainment
- 2.7 residential medical and care facilities
- 2.8 *public services establishments*
- 2.9 pre 1919 traditional/historic buildings

3 Site services and system supply

- 3.1 electricity
- 3.2 water
- 3.3 gas
- 3.4 oil
- 3.5 *solid fuel*
- 3.6 solar thermal
- 3.7 heat pumps
- 3.8 water harvesting
- 3.9 drainage

4 Organisational procedures

- 4.1 information management
- 4.2 project management
- 4.3 risk assessment and management
- 4.4 implementing and monitoring health & safety requirements and issues
- 4.5 implementing and monitoring issues relating to the *natural environment*
- 4.6 customer service
- 4.7 accident reporting
- 4.8 emergencies
- 4.9 communication with relevant people

5 Plant

- 5.1 generators
- 5.2 transformers for low voltage hand-tools
- 5.3 lifting equipment
- 5.4 *access equipment*

6 Electrical supply

Extra low voltage and/or low voltage single and/or multi-phase provision for:

- 6.1 control
- 6.2 communication
- 6.3 heating
- 6.4 lighting
- 6.5 power

7 Electrical cables/wiring

- 7.1 thermosetting insulated cables including flexes
- 7.2 single and multicore thermoplastic and thermosetting insulated cables
- 7.3 flat profile cable
- 7.4 mineral insulated cables
- 7.5 single wire armoured cables
- 7.6 armoured/braided flexible cables and cords
- 7.7 fire resistant cable

8 Electrical equipment, accessories and components

8.1 isolators

8.2 circuit breakers

8.3 fuses

8.4 switches

8.5 socket-outlets/fused-spurs

8.6 earthing protection

8.7 motor control equipment

8.8 control panels – environmental control

8.9 control devices - electrical; electronic; electro-mechanical

9 Relevant people

9.1 *customers/clients*

9.2 client representatives

9.3 supervisors

9.4 site/contract manager

9.5 other contractors/trades

9.6 members of the public

9.7 work colleagues

Scope related to knowledge and understanding

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- 4.6 customer service
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- 4.8 emergencies
- 4.9 communication with relevant people

5 **Plant**

- 5.1 generators
- 5.2 transformers for low voltage hand-tools
- 5.3 lifting equipment
- 5.4 *access equipment*

6 **Electrical supply**

Extra low voltage and/or low voltage single and/or multi-phase provision for:

- 6.1 control
- 6.2 communication
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- 6.5 power

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- 7.3 flat profile cable
- 7.4 mineral insulated cables
- 7.5 single wire armoured cables
- 7.6 armoured/braided flexible cables and cords
- 7.7 fire resistant cable

8 **Electrical equipment, accessories and components**

- 8.1 isolators

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- 8.2 circuit breakers
 - 8.3 fuses
 - 8.4 switches
 - 8.5 socket-outlets/fused-spurs
 - 8.6 earthing protection
 - 8.7 motor control equipment
 - 8.8 control panels – environmental control
 - 8.9 control devices - electrical; electronic; electro-mechanical

9 Relevant people

- 9.1 *customers/clients*
- 9.2 client representatives
- 9.3 supervisors
- 9.4 site/contract manager
- 9.5 other contractors/trades
- 9.6 members of the public
- 9.7 work colleagues

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

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

Specification

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

Clients and customers

- purchaser of installation 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
- 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)
- excavating

Access equipment

- scaffold
- ladders
- steps
- staging
- trestles
- mobile elevated work platform (MEWP)

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 suits, aprons, chemical suits
- respiratory protective equipment (RPE)

Solid fuel

- mineral
- biomass
- wood

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
www.buildingcontrol-ni.com/
- 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/>
- International industry standards and regulations
http://www.iso.org/iso/catalogue_ics_browse?ICS1=27&ICS2=060&ICS3=30&

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Originating organisation	SummitSkills
Original URN	M32; M33
Relevant occupations	Air Conditioning Installation Engineer; Air Conditioning Service and Maintenance Engineer; Domestic Heating Systems Installer; Plumbers; Heating and Ventilating Service and Maintenance Engineer; Refrigeration Engineer
Suite	Domestic Plumbing & Heating; Heating and Ventilating; Refrigeration and Air Conditioning
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