
Overview

This standard is for people who diagnose and rectify faults in environmental technology systems that supply the provision in buildings for heat, power, temperature control and/or water

The person carrying out this work must be able to comply with the procedures and methods for diagnosing and rectifying faults in environmental technology systems in buildings 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 have knowledge and understanding of the environmental technology system they are diagnosing and rectifying faults in, and the heat, power, temperature control and/or water system in the building that it is supplying.

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 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 verify that job information and documentation is current and relevant and that the **plant**, instruments, *access equipment* and tools are fit for purpose
 - P2 produce a risk assessment and method statement in accordance with **organisational procedures** for the work to be carried out, including the identification and use of *personal protective equipment*
 - P3 confirm before work starts that the work location and work area can be accessed safely and has been checked for the risk to other personnel on the **site**, and take appropriate action if a risk is present
 - P4 interpret diagrams and drawings to identify the location of the **system's** associated **equipment, accessories and components**
 - P5 establish the effects of fault diagnosis and rectification methods and procedures on **site** activities and the **relevant people** involved
 - P6 ensure that the **system** is in a safe condition to enable fault diagnosis and rectification work to be undertaken
 - P7 complete safe-isolation as required to ensure the safe disconnection, installation and/or connection of electrical equipment, cables/wiring, associated with the **system**
 - P8 diagnose and rectify faults in the **system** in accordance with:
 - P8.1 the **system's** design
 - P8.2 manufacturers' instructions
 - P9 replace and/or repair, as required, the **system's** associated **equipment, accessories and components**
 - P10 **test**, as required, the integrity of the **system** and its associated **equipment, accessories and components** on completion of the diagnosing and fault rectification work
 - P11 commission the associated **equipment, components and accessories**, adjusting safely and effectively the control features in accordance with:
 - P11.1 the **system's** design
 - P11.2 the **working environment**
 - P11.3 manufacturers' instructions

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- P12 confirm with the **relevant people**:
 - P12.1 those necessary variations to the planned programme of work
 - P12.2 the actions to be taken to ensure that any variations to the planned programme of work minimise hazard the potential for hazard and risk
 - P13 obtain *customer/client* acceptance in accordance with **organisational procedures** of the **system** and its associated **equipment, accessories and components** that has undergone fault diagnosis and rectification work
 - P14 implement **organisational procedures** for the safe transport and/or disposal of any waste material, substances and liquids in accordance with suppliers' and manufacturers' instructions
 - P15 complete relevant documentation in accordance with **organisational procedures**

Knowledge and understanding

To carry out 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 **systems** and its associated **equipment, components and accessories in relation to:**
- K1.1 the **working environment**
 - K1.2 the building's heat, power, temperature control and/or water provision and requirements
- K2 the **appropriate industry standards and regulations** relevant to diagnosing and rectifying faults in environmental technology **systems**
- K3 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
- K4 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:
- K4.1 the **system's** design
 - K4.2 the conditions of the **working environment**
- K5 how to interpret diagrams and drawings to identify the location of the **system's** associated **equipment, accessories and components**
- K6 the correct procedures for safe-isolation of electrical supplies
- K7 the methods and techniques for diagnosing and rectifying faults in the **system** and its associated **equipment, accessories and components** in accordance with:
- P7.1 the **system's** design
 - P7.2 manufacturers' instructions
- K8 the methods and techniques for replacing and/or repairing, as required, the **system's** associated **equipment, accessories and components in** accordance with:
- K8.1 the **system's** design
 - K8.2 manufacturers' instructions
- K9 the methods, techniques and procedures used to ensure optimum performance of the **system** and its associated **equipment, accessories and components**

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- on completion of the fault diagnosis and rectification activity
- K10 the methods, techniques and procedures used to **test**, as required, the integrity of the **system** and its associated **equipment, accessories and components** on completion of the fault diagnosis and rectification activity
- K11 how to implement **organisational procedures** for the safe transport and/or disposal of any waste material, substances and liquids in accordance with suppliers' and manufacturers' instructions
- K12 the **organisational procedures** for:
- K12.1 confirming with **relevant people** those necessary variations to the planned programme of work that may have the potential to introduce a hazard and/or impact on the fault diagnosis and rectification work to be undertaken
- K12.2 confirming with **relevant people** the correct actions to be taken to ensure that any variations to the planned programme of work will not introduce a hazard and have minimum impact on the fault diagnosis and rectification work to be undertaken
- K12.3 obtaining *customer/client* acceptance of the **system** and its associated **equipment, accessories and components** that has undergone fault diagnosis and rectification work
- K13 how to complete relevant documentation in accordance with **organisational procedures**

Additional information**Scope related to performance criteria and knowledge and understand**

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

1 Working Environment (Internal and/or External)

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

2 Systems

- 2.1 solar photo-voltaic
- 2.2 solar thermal
- 2.3 ground source heat pumps
- 2.4 air source heat pumps
- 2.5 micro combined heat and power (micro-CHP/ domestic CHP)
- 2.6 grey water recycling
- 2.7 rainwater harvesting
- 2.8 biomass
- 2.9 micro-wind turbine
- 2.10 micro hydro

3 Equipment, accessories and components

- 3.1 solar voltaic modules/arrays
- 3.3 inverters
- 3.4 isolation and control devices
- 3.5 wind turbines (small scale)
- 3.6 water turbines (small scale)
- 3.7 generators

- 3.8 solar thermal collectors
- 3.9 circulating pumps
- 3.10 expansion vessels
- 3.11 storage vessels
- 3.12 drainback vessels
- 3.13 cisterns
- 3.14 boilers
- 3.15 heat exchangers
- 3.16 heat pumps (non-refrigerant)
- 3.17 accelerators
- 3.18 valves
- 3.19 micro combined heat and power units (micro-CHP/ domestic CHP)

4 **Tests**

- 4.1 electrical continuity
- 4.2 presence of electrical supply
- 4.3 polarity
- 4.4 insulation resistance
- 4.5 earth-fault loop impedance
- 4.6 pressure tests for pipework systems
- 4.7 static pressure tests
- 4.8 air tests
- 4.9 system hygiene and charging
- 4.10 functional/performance tests

5 **Site**

- 5.1 new build construction
- 5.2 existing building

6 **Plant**

- 6.1 generators
- 6.2 transformers for low voltage hand-tools
- 6.3 lifting equipment
- 6.4 *access equipment*

7 Organisational procedures

7.1 information management

7.2 project management

7.3 risk assessment and management

7.4 implementing and monitoring health and safety requirements and issues

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

7.6 customer service

7.7 accident reporting

7.8 emergencies

7.9 communication with relevant people

8 Relevant people

8.1 *customers/clients*

8.2 client representatives

8.3 supervisors

8.4 site/contract manager

8.5 other contractors/trades

8.6 members of the public

8.7 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)

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)

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/>
- International industry standards and regulations
http://www.iso.org/iso/catalogue_ics_browse?ICS1=27&ICS2=060&ICS3=30&
- The requirements and information on microgeneration
<https://www.gov.uk/government/publications/microgeneration-strategy>

SUMETS03

Diagnose and rectify faults in environmental technology systems



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