SUMHV09 - SQA Code HC84 04

Service and maintain industrial and commercial heating and ventilating systems

Overview

This standard is for people who service and maintain industrial and commercial heating and ventilating systems.

The person performing this work must be able to comply with the correct procedures and practices for servicing and maintaining industrial and commercial heating and ventilating 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 environment and the natural environment. They must know and understand the operation, types, and application of the following systems:

Pipework

- hot water
- cold water
- chilled water
- compressed air
- steam

and/or

Ductwork

- supply, extract and re-circulation
- local exhaust ventilation
- low, medium and high pressure air
- kitchen extract

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.

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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 verify that the job information and documentation are 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 select materials, **equipment, accessories and components** needed to complete the service and/or maintenance activity and confirm that they are:

- P4.1 of the right type and size
- P4.2 fit for purpose in accordance with the **system's** design
- P4.3 suitable for the **working environment**

P5 interpret diagrams and drawings to identify the location of the **system's** associated **equipment, accessories and components** that need servicing and/or maintaining

P6 complete safe-isolation as required to ensure the safe disconnection, installation and/or connection of electrical equipment, cables/wiring, associated with the **system**

P7 service and/or maintain the **system** and its associated **equipment, accessories and components** in accordance with:

- P7.1 the **system's** design
- P7.2 the **working environment**
- P7.3 manufacturers' instructions

P8 replace and/or repair, as required, the **system's** associated **equipment, accessories and component**

P9 perform **soundness testing,** as required**,** to confirm the integrity of the **system** and its associated **equipment, accessories and components** on completion of the service and/or maintenance activity

P10 commission the associated **equipment, components and accessories**, adjusting safely and effectively the control features in accordance with:

P10.1 the **system's** design

P10.2 the **working environment**

P10.3 manufacturers' instructions

P11 confirm with the **relevant people:**

P11.1 those necessary variations to the planned programme of work

P11.2 the actions to be taken to ensure that any variations to the planned programme of work minimise the potential for hazard and risk

P12 obtain *customer/client* acceptance of the serviced and/or maintained **system** and its associated **equipment, accessories and components** in accordance with **organisational procedures**

P13 implement **organisational procedures** for the safe transport and/or disposal of any waste material, substances and liquids in accordance with suppliers' and manufacturers' instructions

P14 complete relevant documentation in accordance with **organisational procedures**

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 operation, applications, advantages and limitations of different **systems** and their associated **equipment, components and accessories** in relation to:

- K1.1 the **system's** design
- K1.2 the **working environment**

K2 the **appropriate industry standards and regulations** relevant to servicing and maintaining industrial heating and ventilating **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 performed, 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**
- K4.3 **organisational procedures**
- K4.4 activities of other personnel on **site**

K5 how to select materials, **equipment, accessories and components** needed to complete the service and/or maintenance activity and confirm that they are:

- K5.1 of the right type and size
- K5.2 fit for purpose in accordance with the **system's** design
- K5.3 suitable for the **working environment**

K6 how to interpret diagrams and drawings to identify the location of the **system's** associated **equipment, accessories and components** that need servicing and/or maintaining

K7 as required, the correct procedures for safe-isolation of electrical supplies

K8 the methods and techniques for servicing and/or maintaining the **system** and its associated **equipment, accessories and components** in accordance with:

- K8.1 the **system's** design
- K8.2 manufacturers' instructions

K9 the methods and techniques for replacing and/or repairing, as required, the **system's** associated **equipment, accessories and components in** accordance with:

K9.1 the **system's** design

K9.2 manufacturers' instructions

K9.3 appropriate **jointing methods**

K10 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

K11 the methods, techniques and procedures used to perform **soundness testing,** as required**,** to confirm the integrity of the **system** and its associated **equipment, accessories and components** on completion of the service and/or maintenance activity

K12 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

K13 the **organisational procedures** for:

K13.1 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 service and/or maintenance work to be undertaken

K13.2 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 service and/or maintenance work to be undertaken

K13.3 obtaining *customer/client* acceptance of the serviced and/or maintained **system** and its associated **equipment, accessories and components**

K14 how to complete relevant documentation in accordance with **organisational procedures**

Additional information

Scope related to performance criteria and knowledge and understanding:

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 industrial
1.3 agricultural/horticultural
1.4 leisure and entertainment
1.5 residential medical and care facilities
1.6 *public services establishments*
1.7 pre 1919 traditional/historic buildings

2 **Site services**

2.1 electricity
2.2 water
2.3 gas
2.4 oil

3 **Systems**

Industrial and commercial heating and ventilating ductwork

3.1 supply, extract and re-circulation
3.2 local exhaust ventilation
3.3 low, medium and high pressure air
3.4 kitchen extract

Industrial and commercial heating and ventilating pipework

3.5 hot water – open vented/indirect/secondary circulation/instantaneous
3.6 cold water – storage/none storage
3.7 chilled water systems – air conditioning, refrigeration, heat rejection
3.8 warm air
3.9 compressed air
3.10 fire protection
3.11 steam

4 **Equipment, components and accessories**

4.1 air handling units

4.2 fans

4.3 dampers

4.4 access doors

4.5 terminal units

4.6 laboratory fume cupboards

4.7 storage cabinets

4.8 ventilation hoods

4.9 filters

4.10 humidifiers

4.11 metal and flexible ductwork

4.12 measuring instruments

4.13 fuel-fired boilers (gas; oil; solid fuel)

4.14 hot water storage vessels

4.15 water heaters

4.16 pumps

4.17 heat emitters and exchangers

4.18 burners

4.19 flues

4.20 cisterns

4.21 refrigeration plant

4.22 air conditioning plant

4.23 calorifiers

4.24 valves

4.25 compressors

4.26 receivers

4.27 filters

4.28 pressure vessels

4.29 sprinkler heads

4.30 traps and strainers

4.31 measuring instruments

4.22 environmental technology equipment

4.23 prefabricated modules

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

Range related to performance criteria and knowledge and understanding:

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 **Soundness testing**

2.1 pressure
2.2 system hygiene and charging
2.3 performance tests

3 **Jointing methods**

3.1 compression
3.2 threaded/grooved
3.3 flanges
3.4 welding
3.5 adhesives

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
- 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
- the quality of buildings and building work in England, Northern Ireland, Scotland and Wales
- working at heights
- workplace health and safety and welfare
- environmental protection
- heritage/historic building requirements
- brazing/jointing standards
- requirements for electrical installations
- carriage of Dangerous Goods (Classification, Packaging and Labelling) and use of transportable pressure receptacles

Specification

A verbal and/or documented instruction that is an explicit set of requirements for servicing and maintaining 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 service and 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
- 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)

Pipework

- copper pipes
- low carbon steel pipes
- plastic pipes
- flanges
- joints
- fitting and fixing accessories

Links to other NOS LINKS

External Links Links current 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
- BRA Jointing of Copper Pipework Guide http://www.feta.co.uk/associations/bra/downloads
- Waste Electrical and Electronic Equipment recycling (WEEE): www.hse.gov.uk/waste/waste-electrical.htm
- Control of Substances Hazardous to Health (COSHH): www.hse.gov.uk/coshh
- Construction (Design and Management) Regulations: http://www.hse.gov.uk/construction/cdm.htm

The candidate and assessor must only sign below when all Performance Criteria and Knowledge points have been met.

Unit assessed as being complete

Candidate's Name:	
Candidate's Signature:	
Date submitted to assessor as complete:	

Assessor's Name:	
Assessor's Signature:	
Date assessed as complete:	

Internal Verification —

to be completed in accordance with centre's IV strategy

Evidence for this Unit was sampled on the following date/s:	**IV's Signature**	**IV's Name**

This Unit has been subject to an admin check in keeping with the centre's IV strategy.

Date of admin check	**IV's Signature**	**IV's Name**

Unit completion confirmed

IV's Name:	
IV's Signature:	
Date complete:	