SUMHV04 (SQA Unit Code – H9LJ 04)

Install and test industrial and commercial heating and ventilating pipework systems

Overview

This standard is for people who install and test industrial and commercial heating and ventilating pipework systems.

The person performing this work must be able to comply with the correct procedures and practices for installing and testing industrial and commercial heating and ventilating pipework 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 methods, procedures and techniques for fitting, fixing and connecting components and accessories, including welding, and the pipework requirements of the following systems:

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

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 confirm, as required, that the **site services** are compatible with the **system's** design

P3 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*

P4 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

P5 select the **equipment, components and accessories** to be installed ensuring they are:

- P6.1 of the right type and size
- P6.2 fit-for-purpose
- P6.3 in accordance with the **system's** design
- P6.4 suitable for **the working environment** in which they are to be installed

P6 determine at the outset, that the plans for positioning and fixing **equipment, components and accessories** are in accordance with:

- P6.1 the **system's** design
- P6.2 the **working environment**
- P6.3 manufacturer instructions

P7 comply with industry practices and **organisational procedures** to ensure the co-ordination of **site services** and the activities of other trades

P8 measure and mark out locations for fitting and fixing the selected **equipment, components and accessories** in accordance with:

- P8.1 the **system's** design
- P8.2 manufacturer instructions

P9 prepare, fit, fix and connect the selected **pipework** and **equipment, components and accessories** using suitable **jointing methods** in

accordance with:

P9.1 the **system's** design

P9.2 the **working environment**

P9.3 manufacturer instructions

P9.4 when required, appropriate **welding** techniques

P10 adjust, as appropriate, safety and control features of the **system**

P11 carry out cleaning and flushing of the **system** as required

P12 confirm the integrity of the installed **system** using **soundness testing**

P13 confirm with the **relevant people**:

P13.1 those necessary variations to the planned programme of work

P13.2 the correct 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 suppliers' and manufacturers' 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 operation, applications, advantages and limitations of different **systems**

K2 the applications, advantages and limitations of **system equipment, components and accessories** in relation to the **working environment**

K3 the **appropriate industry standards and regulations** relevant to installing and testing the **systems**

K4 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

K5 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:

- K5.1 the **system's** design
- K5.2 the conditions of the **working environment**
- K5.3 **organisational procedures**
- K5.4 activities of other personnel on **site**

K6 the methods for determining the type and size of **equipment, components and accessories** for the **system**

K7 how to interpret diagrams and drawings of the **system** to:

- 7.1 locate **site services**
- 7.2 identify the planned location of the **system's, equipment, components and accessories**

K8 the **organisational procedures** for confirming, 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 for taking appropriate action if a risk is present

K9 the methods, techniques and **jointing methods** for fitting, fixing and connecting the selected **equipment, components and accessories** in accordance with:

- K9.1 the **system's** design
- K9.2 the **working environment**
- K9.3 manufacturer instructions

K9.4 when required, appropriate **welding** techniques

K10 the **soundness testing** procedures for confirming the **system**'s integrity

K11 the methods and techniques for adjusting safety and control features

K12 the methods and techniques for cleaning and flushing the **system**

K13 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

K14 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

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
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 **Site services**

2.1 electricity
2.2 water
2.3 gas
2.4 oil

3 **Systems**

Industrial and commercial heating and ventilating pipework

3.1 hot water – open vented/indirect/secondary circulation/instantaneous
3.2 cold water – storage/none storage
3.3 chilled water systems – air conditioning, refrigeration, heat rejection
3.4 compresed air
3.5 fire protection
3.6 steam

4 **Equipment, components and accessories**

4.1 fuel-fired boilers (gas; oil; solid fuel)
4.2 hot water storage vessels
4.3 water heaters
4.4 pumps
4.5 heat emitters
4.6 heat exchangers
4.7 burners
4.8 flues
4.9 cisterns
4.10 refrigeration plant
4.11 air conditioning plant
4.12 calorifiers
4.13 valves
4.14 compressors
4.15 receivers
4.16 filters
4.18 pressure vessels
4.19 sprinkler heads
4.20 traps and strainers
4.21 measuring instruments
4.22 environmental technology equipment
4.23 prefabricated modules

5 **Organisational Procedures**

5.1 information management
5.2 project management
5.3 risk assessment/management
5.4 implementing and monitoring health & safety requirements and issues
5.5 implementing and monitoring issues relating to the *natural environment*
5.6 customer service
5.7 accident reporting
5.8 emergencies
5.9 communication with relevant people

6 **Welding**

6.1 manual arc welding

6.2 oxy-acetylene welding

6.3 tungsten inert welding

7 **Plant**

7.1 generators

7.2 transformers for low voltage hand-tools

7.3 lifting equipment

7.4 *access equipment*

8 **Site**

8.1 new build construction – building or structure

8.2 existing building or structure

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

3 **Jointing methods**

3.1 welding
3.2 threaded
3.3 grooved
3.4 flanges
3.5 compression
3.6 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 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)

Pipework

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

Links to other NOS

EUSDSG3.10 – Install gas warm air central heating systems and appliances
EUSDSG3.11 - Maintain gas warm air central heating systems and appliances
EUSDSG3.3 – Install gas water heating and wet central heating appliances
EUSDSG3.5 – Install gas pipework up to 35mm BS6891
EUSDSG3.60 – Gas tightness testing and direct purging – IGE/UP/1B
SUMETS1 Plan, prepare and install Environmental Technology Systems
SUMETS7 Service and Maintain Environmental Technology Systems
SUMETS10 Inspect & Commission Environmental Technology Systems
SUMETS11 Diagnose & Rectify Faults in Environmental Technology Systems

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
- Industrial and commercial H&V and Air Conditioning Standards http://www.iso.org/iso/home/store/catalogue_tc/catalogue_tc_browse.htm?commid=50356
- 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

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