



## F9NH 04 – Install, Test and Commission Hot and Cold Water Systems

This Unit comprises of the following combinations of National Occupational Standards (NOS) shown below by award it appears in.

# SUMMES8

## Identify systems, equipment and components



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### Overview

This unit is about dealing with a customer identifying their requirements and providing commercially acceptable solutions to them. It covers making changes and alterations required by the customer throughout the work.

It is about assessing the implications, impact and feasibility of alterations and changes to the system.

This unit is also about recognising when variations to the work programme are necessary and knowing how to go about agreeing these, and the relevant people with which to liaise.

# SUMMES8

## Identify systems, equipment and components

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### Performance criteria

*You must be able to:*

- P1 identify and record the customer job requirements
- P2 obtain and record information on the work location and features
- P3 identify any areas of the proposed system or components where compliance with industry requirements is necessary
- P4 identify alternative system options, including environmental technologies, and taking into consideration factors such as efficiency (e.g. energy or water)
- P5 explain clearly to relevant people system options which meet identified requirements and those which offer additional benefits such as energy or water efficiency
- P6 obtain customer agreement to the proposal
- P7 carry out and apply relevant calculations to determine system component requirements
- P8 present the system proposal in a manner which enables customer agreement
- P9 confirm that the completed system meets requirements
- P10 inform the relevant person(s) immediately when changes are necessary before work can commence
- P11 record and agree with the relevant person, necessary changes to the work that have cost implications and act on those changes as appropriate

# SUMMES8

## Identify systems, equipment and components

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### Knowledge and understanding

*You need to know and understand:*

- K1 how to obtain information from site drawings and plans
- K2 how to carry out a review of the location
- K3 the range of documentation detailing industry requirements
- K4 how to identify possible proposals which meet the following: customer requirements, site structures and features, and industry requirements
- K5 the range of environmentally friendly materials, products, procedures and energy saving devices applicable to their work and the benefits of their use
- K6 how to obtain agreement from the customer to progress a selected system proposal
- K7 the range of job information that is required to develop proposals for work on new buildings and existing properties
- K8 positioning requirements for components within systems and standard system layouts
- K9 how to calculate the requirements of system components – size and specification
- K10 methods of presenting information to customers through the use of drawings, specifications and quotations
- K11 the authority and organisational procedures at the site relevant to work plans and changes to the work plans
- K12 how to negotiate variations to work programmes, under what circumstances this might be necessary and the need to obtain written acceptance to major work or material variations and the organisational requirements for reporting changes

# SUMMES8

Identify systems, equipment and components

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**Originating organisation** SummitSkills

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**Original URN** M8

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**Relevant occupations** Building and construction; Skilled Trades Occupations

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**Suite** Mechanical Engineering Services

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**Key words** customer requirements, alterations

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# SUMMES21

## Install industrial and commercial heating & ventilating systems, equipment and components



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### Overview

This unit is about installing heating systems and components and involves conducting the appropriate soundness testing of systems and components, and the appropriate specified testing procedures during or after the installation of components.

The person carrying out the work must understand how various components relate to each other within the systems being installed.

# SUMMES21

## Install industrial and commercial heating & ventilating systems, equipment and components

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### Performance criteria

- You must be able to:*
- P1 confirm that the customer is aware that job information on all key aspects of the installation process is available
  - P2 confirm that all materials, tools and equipment necessary for the installation process will be available as required
  - P3 arrange safe storage provision for materials, tools and equipment, which meet industry requirements
  - P4 confirm that all preparatory work to meet the installation requirements of systems and components has been carried out
  - P5 confirm that the materials, tools and equipment required for the installation processes are fit for their intended purpose
  - P6 assemble system components using work methods that conform to industry requirements
  - P7 position system components to conform to the system design requirement
  - P8 fix system components using methods that conform to industry requirements
  - P9 connect system components to systems and input service connections using methods that meet industry requirements
  - P10 carry out the installation processes in line with industry requirements, minimising damage to customer property and building features
  - P11 report to the immediate job supervisor, line manager or customer in accordance with industry requirements any circumstances that affect the progress of the installation
  - P12 confirm the integrity of the installed system using specified testing procedures
  - P13 take precautionary actions to prevent the unauthorised use of un-commissioned systems and components

# SUMMES21

## Install industrial and commercial heating & ventilating systems, equipment and components

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### Knowledge and understanding

*You need to know and understand:*

- K1 how to measure and record site details for installation purposes
- K2 the industry practices and work standards for installing system components
- K3 the positioning and fixing requirements for system components which conform to the system design and intended functions
- K4 the procedures required for connecting to input services or connecting into existing systems
- K5 methods of working which protect the building fabric, customer property and existing systems or components
- K6 job management structures and methods of reporting and recording job progress or problems delaying progress
- K7 the care and maintenance requirements of tools and equipment, and the checks required to confirm they are in a safe condition
- K8 the range of tests used to confirm the soundness of systems and components and how to use the range of specified testing procedures
- K9 what precautionary actions are required during installation and testing



# SUMMES21

Install industrial and commercial heating & ventilating systems, equipment and components

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**Suite** Mechanical Engineering Services

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**Key words** Install, component test procedure

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## SUMMES25

### Inspect and test mechanical systems, equipment and components



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#### Overview

This unit is about carrying out pre-commissioning checks and tests on systems.

The person carrying out the work must be able to undertake the various checks and tests necessary before the system is brought into operation.

They are required to check the operation and correct position of components. They must also carry out tests to ensure there are no leaks and undertake cleaning or flushing of the system.

In the case of ductwork, there is a specified, permissible level of air leakage.

It is important that they are aware of the effect that isolating part of a system has on the full system.

# SUMMES25

## Inspect and test mechanical systems, equipment and components

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### Performance criteria

- You must be able to:*
- P1 confirm that the system or components installation complies with industry requirements
  - P2 check that input services to the system components are suited to their intended purpose
  - P3 check system or components for soundness using procedures that comply with industry
  - P4 carry out pre-commissioning tests and checks in accordance with industry requirements
  - P5 check that the system cleanliness, additives and charging comply with industry

# SUMMES25

## Inspect and test mechanical systems, equipment and components

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### Knowledge and understanding

*You need to know and understand:*

- K1 the procedures, equipment and legislative requirements for applying specified tests to systems
- K2 the methods of establishing that input services adequately supply all components within the system
- K3 the methods of connecting components to systems
- K4 the actions to take where pre-commissioning checks or tests reveal basic or complex system or component defects
- K5 how to complete pre-commissioning documentation confirming the safe pre-commissioning of systems and components

# SUMMES25

Inspect and test mechanical systems, equipment and components

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**Relevant occupations** Building and construction; Skilled Trades Occupations

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**Suite** Mechanical Engineering Services

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**Key words** pre-commissioning check, clean & flush, leaks

## EUSDSG3.43

# Decommission heating & ventilation systems, equipment and components



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### Overview

This unit is about de-commissioning systems, ready for further work or long-term isolation. If the system is to be permanently de-commissioned, this may involve the removal of components.

The person carrying out the work is also required to make arrangements with users of the work location and ensure their safety throughout the process.

Note: This national occupational standard (Ref ID M26) belongs to SummitSkills – the Sector Skills Council for the Building Services Engineering Sector.

## **EUSDSG3.43**

### **Decommission heating & ventilation systems, equipment and components**

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#### **Performance criteria**

*You must be able to:*

- P1 liaise with other persons at appropriate points within the de-commissioning process to minimise disturbance to work routines
- P2 check that conditions within the systems or components will permit safe de-commissioning
- P3 de-commission systems or components using tests and procedures which comply with industry requirements
- P4 take precautionary actions to ensure that de-commissioned systems or components do not prove a safety hazard
- P5 check that the de-commissioned systems and components are left safe, in line with industry requirements

## EUSDSG3.43

### Decommission heating & ventilation systems, equipment and components

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#### Knowledge and understanding

*You need to know and understand:*

- K1 the importance of confirming the system functions, and the outcomes of suspending the operation of the system
- K2 the need to liaise with others whose procedures or routines may be affected by the suspension of the system operation
- K3 the potential hazards that could arise from de-commissioning activities and the checks to be carried out before de-commissioning takes place
- K4 de-commissioning procedures for temporary and permanent de-commissioning of systems, including organisational requirements
- K5 the precautions to ensure that de-commissioned systems do not prove a safety hazard, and the necessary measures to prevent systems being brought into operation, including using the correct safety and warning notices
- K6 how to safely collect and dispose of system contents that may be hazardous to health or harmful to the environment
- K7 how to complete systems de-commissioning records
- K8 system contents requiring recovery for re-use or disposal
- K9 the operating and working principles of the system to be decommissioned
- K10 what action to take when normal emptying or shut off mechanisms do not operate



## **EUSDSG3.43**

### Decommission heating & ventilation systems, equipment and components

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**Relevant occupations** Engineering; Science and Engineering Technicians

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**Suite** Down Stream Gas

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**Key words** decommission, heating, ventilation, systems, equipment, components

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## Overview

This unit is about commission systems following the appropriate pre-commissioning tests and checks being carried out.

It is about bringing the system into operation and ensuring it operates effectively as intended.

The person carrying out this work is required to check that components are installed correctly, ensure there are no leaks and undertake cleaning and flushing.

For ductwork there is a specified permissible level of air leakage. It is not intended that they meet the demands of commissioning specialists. As a guide, they should be able to operate on heating systems with an input of up to 60kW for domestic installation and 150kW for industrial and commercial.

It is important that they are aware of the effect that isolating part of a system has on the full system.

# SUMMES27

## Commission mechanical systems

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### Performance criteria

- You must be able to:*
- P1 ensure that the necessary information on the system or component performance is available
  - P2 liaise with other persons at appropriate points within the commissioning process to minimise disturbance to work routines
  - P3 check the correct function of systems or components against performance requirements
  - P4 adjust system controls to establish that system components meet design specification
  - P5 provide the customer with information necessary to the continuing operation of the system or component

# SUMMES27

## Commission mechanical systems

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### Knowledge and understanding

*You need to know and understand:*

- K1 the sources of information on the performance of systems or components
- K2 the procedures for establishing correct system or component performance and checking against the job specification
- K3 the routines and sequences for commissioning systems or components
- K4 the points in the commissioning process where co-operation and liaison with other trades and customers may be required
- K5 where to access user information appropriate to different systems and components
- K6 how to complete commissioning documentation confirming the safe commissioning of systems and components
- K7 system handover procedures and demonstrating the operation of systems and components to end-users
- K8 the actions to take when components being commissioned do not meet performance requirements

# SUMMES27

## Commission mechanical systems

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**Suite** Mechanical Engineering Services

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**Key words** commission, test, clean & flush