



F9MX 04 – Diagnose and Rectify Faults on Hot and Cold Water Systems

This Unit comprises of the following National Occupational Standards (NOS)

SUMMES25

Inspect and test mechanical systems, equipment and components



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

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

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

Developed by SummitSkills

Version number 1

Date approved October 2008

Indicative review date October 2010

Validity Current

Status Original

Originating organisation SummitSkills

Original URN M25

Relevant occupations Building and construction; Skilled Trades Occupations

Suite Mechanical Engineering Services

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

EUSDSG3.43

Decommission heating & ventilation systems, equipment and components



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

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

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

Developed by Energy and Utility Skills

Version number 1

Date approved February 2010

Indicative review date February 2012

Validity Current

Status Imported

Originating organisation SummitSkills

Original URN DSG3.43

Relevant occupations Engineering; Science and Engineering Technicians

Suite Down Stream Gas

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

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

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

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

Developed by SummitSkills

Version number 1

Date approved October 2008

Indicative review date October 2010

Validity Current

Status Original

Originating organisation SummitSkills

Original URN M27

Relevant occupations Building and construction; Skilled Trades Occupations

Suite Mechanical Engineering Services

Key words commission, test, clean & flush

SUMMES28

Identify faults in mechanical systems, equipment and components



Overview

This unit covers the key areas of maintenance work involving diagnosing the cause of faults in systems and components. Diagnostic requirements in this unit apply only to system components. It does not include appliances.

The person carrying out this work should be able to locate simple faults in the system or component performance.

SUMMES28

Identify faults in mechanical systems, equipment and components

Performance criteria

- You must be able to:*
- P1 obtain clear and detailed information about the reported faults including any components which need to be replaced
 - P2 advise the relevant people clearly and accurately about the potential disruption and consequences of carrying out a diagnosis of faults
 - P3 locate faults in systems or system components using procedures that comply with industry requirements
 - P4 report to the relevant person diagnosed faults in systems and components
 - P5 liaise with other persons to agree fault rectification procedures which will minimise disruption to work routines

SUMMES28

Identify faults in mechanical systems, equipment and components

Knowledge and understanding

You need to know and understand:

- K1 the necessary information for carrying out a successful fault diagnosis
- K2 how to interpret information on system or component performance, including advice from users, visual inspections or checks or diagnosis tests to locate faults
- K3 the potential disruption and consequences of carrying out a diagnosis of faults
- K4 how to liaise with others to ensure co-operation in the fault diagnosis process
- K5 the work action and sequences required to diagnose faults in systems and components
- K6 the measures to ensure that systems do not present a safety hazard to potential users, or the workforce, when carrying out diagnosis procedures
- K7 how to isolate unsafe systems and components
- K8 the procedures for reporting diagnosed faults in systems and components
- K9 how to interpret information on system or component performance, including advice from users, visual inspections, checks or performance tests to locate faults
- K10 the work procedures for the rectification of faults in systems or components which will ensure minimum disruption to customers and routines
- K11 how to identify common faults of principal components within systems
- K12 component/principal components and system operation principles
- K13 the operating principles of gas, oil and solid fuel boilers and the differences between them for rectification purposes
- K14 effects of component faults upon overall system performance and correct methods to ascertain component fault
- K15 how to access and interpret specifications, drawings and technical data relevant to system layout, design and component/principal components function
- K16 organisational and maintenance contract procedures, their purpose and application

SUMMES28

Identify faults in mechanical systems, equipment and components

Developed by SummitSkills

Version number 1

Date approved October 2008

Indicative review date October 2010

Validity Current

Status Original

Originating organisation SummitSkills

Original URN M28

Relevant occupations Building and construction; Skilled Trades Occupations

Suite Mechanical Engineering Services

Key words simple system faults, component performance.

SUMMES29

Rectify and modify mechanical systems, equipment and components



Overview

This unit is about being able to rectify faults in systems and components, including modification and re-commissioning.

The person carrying out this work must demonstrate a sound knowledge and understanding of system operating principles and the main types of modifications and rectification activities applicable.

It is vital that the relevant electrical tests are carried out and that whilst undertaking diagnostic tasks, compliance with relevant recommendations and regulations is demonstrated. Mains supplies and energy sources must be traced, located and identified and electrical connections must be safely isolated and disconnected at the appropriate stage in the process.

The person carrying out this work must be aware of the effect isolating part of a system has to the full system status.

Systems are required to be rectified and/or modified using diagnostic skills to restore specified operational performance.

They must be able to undertake the required rectification or modification safely to meet the relevant recommendations, regulations and standards. Relevant documentation is to be completed and made available in line with company procedures if applicable.

For de-commissioning, they must make arrangements with users of the work location and ensure their safety throughout the process.

SUMMES29

Rectify and modify mechanical systems, equipment and components

Performance criteria

- You must be able to:*
- P1 carry out rectifying and modifying actions to minimise risk to individuals and the environment
 - P2 carry out rectifying and modifying actions to minimise system downtime
 - P3 carry out rectifying and modifying actions in agreement with the customer
 - P4 isolate systems or partial systems from supply services in accordance with industry requirements
 - P5 carry out rectifying and modifying actions appropriate to the systems and components
 - P6 rectify effective system performance to industry requirements
 - P7 implement rectification and modifying actions that maintain the overall specified system
 - P8 complete documentation that is complete, accurate, and legible and made available to the customer

SUMMES29

Rectify and modify mechanical systems, equipment and components

Knowledge and understanding

You need to know and understand:

- K1 the source of information on the preparatory work necessary for the system or component rectification
- K2 the importance of minimising risks to individuals and the environment
- K3 how to carry out work efficiently, logically and in line with customer requirements
- K4 why relaying information to the customer and gaining agreement is important
- K5 correct methods and procedures for isolating mains supplies, energy sources and electrical connections
- K6 correct methods and procedures for emptying systems or parts of systems
- K7 working principles of systems within the range
- K8 the operating principles of gas, oil and solid fuel boilers and their differences in relation to rectifying and modifying systems
- K9 how to compare technical performance of replacement components to faulty components/principal components
- K10 correct installation requirements and procedures for components/principal components of systems, implications of incorrect fixing and different methods of fixing and connecting
- K11 how to ascertain components/principal components are electrically safe
- K12 how to ensure that overall system performance is not impaired following rectification and modification works

SUMMES29

Rectify and modify mechanical systems, equipment and components

Developed by SummitSkills

Version number 1

Date approved October 2008

Indicative review date October 2010

Validity Current

Status Original

Originating organisation SummitSkills

Original URN M29

Relevant occupations Building and construction; Skilled Trades Occupations

Suite Mechanical Engineering Services

Key words operating principles, mains supplies, safe isolation