SEMEM342

Maintaining environmental control equipment

Overview

This standard identifies the competences required to carry out maintenance on fixed and portable environmental control equipment, in accordance with approved procedures, and to demonstrate an appropriate level of skill and knowledge of the function and operation of a wide range of equipment, which includes: solid and liquid particle separation, gas scrubbers, clean-up equipment, noise and vibration absorbers, and their control equipment. You need to demonstrate your ability to overhaul the plant, or to remove and repair, or replace faulty sub-assemblies and components, including fans, pumps, valves, couplings, ducting, heaters, filters and control equipment. You will need to re-assemble and carry out appropriate test procedures, which may include the use of special purpose tooling and equipment. To help the re-assembly you will, when dismantling equipment, be required to use a logical approach to component identification (proof marking/labelling), and to their assembly criteria. Your responsibilities will require you to comply with organisational policy and procedures for the maintenance activities undertaken, and to report any problems with the maintenance activities, or the tools and equipment used that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You must ensure that all tools, equipment and materials used in the maintenance activities are removed from the work area on completion of the activities, and that all necessary job/task documentation is completed accurately and legibly. You will be expected to work with minimal supervision, taking personal responsibility for your own actions, and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to applying maintenance procedures to environmental control systems and equipment. You will understand the dismantling and reassembly methods and procedures, and their application. You will know how the equipment functions, the purpose of the individual components and associated defects, in adequate depth to provide a sound basis for carrying out the maintenance activities, correcting faults and ensuring that the repaired equipment functions to the required specification and remains compliant with all standards and regulations. You will also have sufficient knowledge of these components to ensure that they are fit for purpose and meet the specifications, thus providing a sound basis for carrying out reassembly.

You will understand the safety precautions required when carrying out the maintenance activities, especially those for isolating the equipment. You will be required to demonstrate safe working practices throughout, and will understand your responsibility for taking the necessary safeguards to protect yourself and others in the workplace.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety legislation and other relevant regulations, directives and guidelines
2. follow the relevant maintenance schedules to carry out the required work
3. carry out the maintenance activities within the limits of your personal authority
4. carry out the maintenance activities in the specified sequence and in an agreed timescale
5. report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule
6. complete and store all relevant maintenance documentation in accordance with organisational requirements
7. dispose of waste materials in accordance with safe working practices and approved procedures and leave the work area in a safe condition

Knowledge and understanding

You need to know and understand:

1. the health and safety requirements of the area in which the maintenance activity is to take place
2. safe working practices, isolation procedures and permit-to-work systems
3. the specific health and safety precautions to be applied during the maintenance procedure, and their effects on others
4. the specific regulations relating to the environmental control equipment being maintained
5. hazards associated with carrying out general maintenance activities (including the use of lubricants, cleaning materials, power tools, the use and misuse of hand tools, and the consequences of not following laid-down, good practice, maintenance procedures), and how to minimise them to reduce any risks
6. the importance of using the correct personal and workplace-safety protection equipment (PPE)
7. how to obtain and interpret drawings, specifications, manufacturers' manuals and other documents needed in the maintenance process
8. the procedure for obtaining replacement parts, materials and other consumables necessary for the maintenance activities
9. organisational policy on the repair/replacement of components during the maintenance process
10. the sequence to be adopted for the dismantling/re-assembly of various types of assemblies
11. the methods and techniques used to dismantle/assemble mechanical equipment (such as release of pressures/force, proof marking, extraction, pressing, alignment)
12. methods of checking that components are fit for purpose, and how to identify defects and wear characteristics
13. how to make adjustments to components/assemblies to ensure that they function correctly
14. the basic principles of how the equipment functions, its operation sequence, the working purpose of individual units/components and how they interact
15. associated hazardous substances, their measurements and exposure limits
16. how to carry out biological monitoring

17. how to carry out hazard and risk assessment
18. the procedures for carrying out noise and vibration measurement
19. the prevention and reduction systems for noise and vibration
20. methods of checking that removed components are fit for purpose, and the need to replace `lifed' items (such as seals and gaskets)
21. the uses of measuring equipment (such as tapes, rules and other measuring devices)
22. how to make adjustments to components to ensure they function correctly
23. how to check that tools and equipment are free from damage or defects, are in a safe and usable condition, and are configured correctly for their intended purpose
24. the generation of maintenance documentation and/or reports following the maintenance activity
25. the equipment operating and control procedures to be applied during the maintenance activity
26. how to use lifting and handling equipment correctly and safely in the maintenance activity
27. the problems associated with the maintenance activity, and how they can be overcome
28. the organisational procedure to be adopted for the safe disposal of waste of all types of material
29. the extent of your own authority and to whom you should report if you have problems that you cannot resolve

Scope/range

1.

Carry out all of the following during the maintenance activities:

1.1 plan and communicate the maintenance work so as to cause minimal disruption to normal working
1.2 obtain and use the correct issue of organisational and equipment suppliers' drawings and maintenance documentation
1.3 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
1.4 ensure the safe isolation of equipment (such as mechanical, electricity, gas, air or fluids)
1.5 ensure the provision of adequate safety barriers and signage about the work area
1.6 carry out the maintenance activities using appropriate techniques and procedures
1.7 record the results of the maintenance activity and report any defects found
1.8 return the equipment in a safe and serviceable condition
1.9 dispose of waste materials in accordance with safe working practices and approved procedures and leave the work area in a safe condition

2.

Carry out maintenance activities on three of the following types of pollution control equipment:

2.1 air pollution control equipment (such as decarbonisation (CO2 reduction), denitrification, deodorising desulphurisation, dust collectors, smoke filters, scrubbers, and removal of refrigerant gases)
2.2 effluent treatment equipment (such as aerobic and anaerobic biochemical treatment, filter screens and presses, liquid separators, waste oil treatment, sewage treatment, industrial waste water treatment)
2.3 noise and vibration equipment (such as vibration prevention and isolation, noise attenuation and acoustic enclosures)
2.4 waste and used product handling, storing and recycling equipment (such as appliance recycling, battery recycling, incinerators, ash handling, heat recovery, shredders and crushers, conveyors and sorters, compaction)

3.

Carry out all of the following maintenance techniques, as appropriate to the equipment being maintained:

3.1 checking components for serviceability
3.2 replacing all `lifed' items
3.3 dismantling assemblies to component level
3.4 replacing damaged/defective components
3.5 functionally testing the completed system

3.6 replenishing oils and greases
3.7 making `off-line' checks before starting up
3.8 setting, aligning and adjusting replaced components
3.9 marking/labelling of components
3.10 tightening fasteners to the required torque

4.

Maintain a range of mechanical environmental control equipment, to include ten of the following:

4.1 actuators
4.2 dampers
4.3 levers and links
4.4 pumps
4.5 bearings
4.6 enclosures and guards
4.7 lubrication systems
4.8 safety devices
4.9 belt drives
4.10 exhaust systems
4.11 mechanical isolators
4.12 seals and gaskets
4.13 burners
4.14 fasteners
4.15 mechanical overloads
4.16 sorting screens
4.17 chains and sprockets
4.18 filters (individual)
4.19 spill kits
4.20 containment booms
4.21 flow measurement
4.22 noise attenuation
4.23 storage tanks
4.24 conveyor belts
4.25 gauges
4.26 pipework
4.27 test systems
4.28 couplings
4.29 geared drives
4.30 pollution samplers
4.31 valves
4.32 pulleys and belts

5.

Maintain a range of electrical environmental control equipment to include ten of the following:

5.1 annunciator systems
5.2 electrical trips
5.3 pollution samplers

5.4 test systems
5.5 building management system (BMS) interfaces
5.6 flow measurement
5.7 radar monitors
5.8 thermistors
5.9 combustion control
5.10 infra-red monitoring
5.11 relays
5.12 thermocouples
5.13 contactors
5.14 interlocks
5.15 resistors
5.16 thermostats
5.17 circuit boards
5.18 inverters
5.19 safety devices
5.20 timers
5.21 control systems
5.22 level floats and indicators
5.23 switchgear
5.24 transducers
5.25 electrical infrastructure
5.26 meters
5.27 sensors solenoids
5.28 transformers
5.29 motor starters
5.30 switches
5.31 electrical isolators

6.

Maintain environmental control equipment in compliance with one of the following:

6.1 organisational guidelines and codes of practice
6.2 equipment manufacturer's operation range
6.3 BS, ISO and/or BSEN standards

7.

Complete and store all relevant maintenance documentation in accordance with organisational requirements. using **one** of the following:

7.1 job cards
7.2 permits to work/formal risk assessment and/or sign-on/off procedures
7.3 maintenance log or report
7.4 company-specific documentation
7.5 electronic records

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