

SEMEMI2-16 - SQA Unit Code H2AV 04

Carrying out fault location on fluid power equipment and circuits



Overview

This unit identifies the competences you need to locate faults on fluid power equipment and circuits, on mobile or static plant, in accordance with approved procedures. You will be required to investigate faults on fluid power equipment such as pneumatic, hydraulic and vacuum devices, both at unit and component level. You will be expected to use a variety of fault location methods and procedures, such as gathering information from the person who reported the fault, using recognised fault finding techniques and diagnostic aids, measuring, inspecting and operating the equipment.

Your responsibilities will require you to comply with organisational policy and procedures for the fault location activities, and to report any problems with these activities, or with the tools and equipment used, that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work to instructions, alone or in conjunction with others, taking full responsibility for your own actions, and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will be sufficient to provide a sound basis for your work, and will provide an informed approach to applying fault location procedures to fluid power equipment. You will have an understanding of the basic fault location methods and techniques used, and their application. You will also know how to interpret the information obtained from fault locating aids and equipment, in adequate depth to provide a sound basis for carrying out the activities.

You will understand the safety precautions required when carrying out the fault location activities, especially those for isolating the equipment. You will also understand your responsibilities for safety, and the importance of taking the necessary safeguards to protect yourself and others in the workplace.

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Performance criteria

You must be able to:

- P1 work safely at all times, complying with health and safety and other relevant regulations and guidelines
- P2 review and use all relevant information on the symptoms and problems associated with the products or assets
- P3 investigate and establish the most likely causes of the faults
- P4 select, use and apply diagnostic techniques, tools and aids to locate faults
- P5 complete the fault diagnosis within the agreed time and inform the appropriate people when this cannot be achieved
- P6 determine the implications of the fault for other work and for safety considerations
- P7 use the evidence gained to draw valid conclusions about the nature and probable cause of the fault
- P8 record details on the extent and location of the faults in an appropriate format

Knowledge and understanding

You need to know and understand:

- K1 the health and safety requirements of the area in which the fault location is to take place, and the responsibility these requirements place on you
- K2 the isolation and lock-off procedure or permit-to-work procedure that applies in the work area
- K3 the importance of wearing protective clothing and other appropriate safety equipment during fault location activities
- K4 hazards associated with carrying out fault location activities on fluid power equipment (such as handling fluids, stored pressure/force, misuse of tools, using practices that do not follow laid-down procedures), and how they can be minimised
- K5 the importance of following the correct de-contamination procedure
- K6 how to obtain and interpret information from job instructions and other documents needed in the fault location process (such as drawings, charts, specifications, manufacturers' manuals, history/maintenance reports, graphical symbols)
- K7 the procedure to be adopted to establish the background of the fault
- K8 how to use the various diagnostic aids to help identify the location of the fault
- K9 the various fault location techniques that can be used, and how they are applied (such as half-split, input-to-output, function testing, unit substitution, equipment self-diagnostics and fault cause remedy)
- K10 how to evaluate sensory information (sight, sound, smell, touch)
- K11 how to assess evidence and evaluate the possible causes of faults/problems
- K12 how to use a range of fault diagnostic equipment to investigate the problem
- K13 the care, handling and application of mechanical measuring/test equipment (such as measuring instruments, pressure and flow indicators and self-diagnostic equipment)
- K14 how to check that fluid power measuring/test equipment is within current calibration dates, and that it is free from damage and defects
- K15 the basic principles of how the fluid power equipment functions, and the operation and application, of the various units and components
- K16 the problems that can occur during the fault location activity, and how they can be minimised
- K17 how to evaluate the likely risk to yourself and others, and the effects the fault could have on the overall process or system
- K18 the importance of completing the correct documentation following the fault locating activity
- K19 the extent of your own authority and to whom you should report if you have problems that you cannot resolve

Additional Information

Scope/range related to performance criteria

You must be able to:

1. carry out **all** of the following during the fault location activity:
 - 1.1. plan the fault location methods and activities in conjunction with others
 - 1.2. use the correct issue of maintenance documentation (such as drawings, manuals, maintenance records)
 - 1.3. adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations
 - 1.4. adhere to company specific contamination and control procedures at all times
 - 1.5. ensure the safe isolation of equipment (such as mechanical, electricity, gas, air or fluids)
 - 1.6. ensure that safe access and working arrangements have been provided for the maintenance area
 - 1.7. carry out the fault location activities, using approved procedures
 - 1.8. identify the fault, and consider appropriate corrective action
 - 1.9. in conjunction with others, take actions to resolve the problem
 - 1.10. dispose of waste items in a safe and environmentally acceptable manner
 - 1.11. leave the work area in a safe and tidy condition

2. carry out fault location on **one** of the following types of fluid power system:
 - 2.1. pneumatic system
 - 2.2. hydraulic system
 - 2.3. vacuum system

to include **six** of the following fluid power components:

 - 2.4. pumps
 - 2.5. pistons
 - 2.6. spools
 - 2.7. valves
 - 2.8. actuators
 - 2.9. motors
 - 2.10. bearings
 - 2.11. reservoirs/storage devices
 - 2.12. accumulators
 - 2.13. pressure intensifiers
 - 2.14. compressors
 - 2.15. receivers
 - 2.16. gaskets and seals
 - 2.17. pipework and hoses/tubing
 - 2.18. switches

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- 2.19. sensors
 - 2.20. lubricators/filters
 - 2.21. regulators
 - 2.22. other specific components
3. use **four** of the following diagnostic techniques, tools and aids to assist in locating the fault:
 - 3.1. information gathered from the person who reported the fault
 - 3.2. fault finding techniques (such as six point, half-split, input/output, unit substitution, emergent sequence)
 - 3.3. diagnostic aids (such as manuals, flow charts, troubleshooting guides, maintenance records)
 - 3.4. inspecting (such as checking for damage, wear/deterioration, leaks, loose fittings and connections)
 - 3.5. operating (such as timing, sequence, movement)
 - 3.6. sequence charts
 - 3.7. functional diagrams
 4. use **two** of the following types of instruments to assist in locating faults:
 - 4.1. measuring devices/meters
 - 4.2. pressure indicators
 - 4.3. flow indicators
 - 4.4. self-diagnostic equipment
 - 4.5. contamination monitoring and analysing devices
 5. find faults that have resulted in **two** of the following breakdown categories:
 - 5.1. intermittent problem
 - 5.2. partial failure or reduced performance
 - 5.3. complete breakdown
 6. complete **one** of the following maintenance records, and pass it to the appropriate person:
 - 6.1. scheduled maintenance report
 - 6.2. other company specific report
 - 6.3. corrective maintenance report

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