

Maintaining fluid power equipment

Overview

This standard identifies the competences you need to carry out corrective maintenance on fluid power equipment, on mobile or static plant, in accordance with approved procedures. You will be required to maintain a range of fluid power equipment, such as hydraulic, pneumatic or vacuum equipment. This will involve dismantling, removing and replacing faulty items, at component and unit level, on such as pumps, valves, actuators, sensors, intensifiers, regulators, compressors, pipes and hoses, and other specific fluid power equipment. This will involve depressurising the system, and removing, replacing and repairing system components, as applicable.

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 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 fluid power equipment. You will understand the dismantling and reassembly methods and procedures used, and their application. You will know how the equipment functions, and the purpose of the individual components, their function and associated defects, in adequate depth to provide a sound basis for carrying out the maintenance activity, correcting faults and ensuring that the repaired equipment functions to the required specification and remains compliant with all standards and regulations. In addition, you will have sufficient depth of knowledge of the various components, to ensure they are fit for purpose and meet the specifications, thus providing a sound basis for carrying out reassembly of the equipment.

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

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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

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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, and the responsibility these requirements place on you
2. the isolation procedures or permit-to-work procedure that applies
3. the specific health and safety precautions to be taken during the maintenance activities, and their effects on others
4. the importance of wearing protective clothing and other appropriate safety equipment (PPE) during maintenance activities
5. the importance of following the correct de-contamination procedure
6. hazards associated with carrying out maintenance activities on fluid power equipment (such as handling fluids, stored pressure/force, misuse of tools), and how to minimise these and reduce any risks
7. regulations and codes of practice that apply to working with fluid power equipment
8. how to obtain and interpret drawings, charts, circuit and physical layouts, specifications, manufacturers' manuals, history/maintenance reports, symbols used in fluid power, and other documents needed in the maintenance activities
9. the procedure for obtaining replacement parts, materials and other consumables necessary for the maintenance activities
10. principles and theories associated with fluid power equipment
11. the basic principles of operation of the equipment to be maintained
12. organisational policy on repair/replacement of components during maintenance process
13. how to construct and apply sequential charts/tables or functional diagrams
14. dry and lubricated systems, and their application
15. selection, types and characteristics of fluids for the system
16. the effects of pressure and flow on the performance of the system
17. the identification of different compressors (such as screw piston, rotary vane)
18. the identification of different hydraulic motors (such as piston, gear, vane)
19. how to determine pressure settings and their effect on the system
20. the different types of pipework, fittings and manifolds, and their application
21. the identification, application, function and operation of different types of valves (such as poppet, spool, piston, disc and slide)
22. the identification, application, function and operation of different types of sensors and actuators (such as rotary, linear, mechanical, electrical)
23. the identification, application, function and operation of different

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- types of actuators/cylinders (such as single acting, double acting and telescopic)
- 24. the identification, application, function and operation of different types of pumps (such as positive and gear vane piston)
- 25. the application and fitting of static and dynamic seals
- 26. recognition of contaminants and the problems they can create, and the effects and likely symptoms of contamination in the system
- 27. the techniques used to dismantle/assemble fluid power equipment (release of pressures/force, proof marking, extraction)
- 28. methods of checking that components are fit for purpose
- 29. how to make adjustments to components/assemblies to ensure that they function correctly
- 30. the identification and working purpose of individual components, and how they interact
- 31. how to check that tools and equipment are free from damage or defect, are in a safe and usable condition, and are configured correctly for the intended purpose
- 32. the generation of maintenance documentation and/or reports following the maintenance activity
- 33. equipment operating and control procedures to be applied during the maintenance activity
- 34. how to use lifting and handling equipment safely and correctly in the maintenance activity
- 35. the problems associated with the maintenance activity, and how they can be overcome
- 36. the procedure to be adopted for the safe disposal of waste of all types of materials
- 37. the limit of your own authority and to whom you should report if you have a problem that you cannot resolve

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Scope/range

1. Carry out all of the following during the maintenance activity:
 1. plan and communicate the maintenance activities to cause minimal disruption to normal working
 2. obtain and use the correct issue of organisational and/or manufacturers' drawings and maintenance documentation
 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
 4. adhere to organisational-specific contamination and control procedures at all times
 5. ensure the safe isolation of equipment (such as mechanical, electricity, gas, air or fluids)
 6. provide and maintain safe access and working arrangements for the maintenance area
 7. carry out the maintenance activities using appropriate techniques and procedures
 8. reconnect and return the system to service on completion of the maintenance activities
 9. record the results of the maintenance activity and report any defects found
 10. 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 two of the following types of fluid power equipment:
 1. pneumatic
 2. hydraulic
 3. vacuum
3. Carry out all of the following maintenance activities, as applicable to the equipment being maintained:
 1. chocking/supporting actuators/rams/component
 2. releasing stored pressure
 3. draining, removing and replacing oil/fluids (as applicable)
 4. replacing damaged/defective components
 5. removing and replacing units/components (such as pumps, valves, actuators)
 6. disconnecting/removing hoses, pipes and tubing
 7. replacing all 'lived' items (such as seals, filters, gaskets,

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- hoses)
 - 8. proof marking/labelling of removed components
 - 9. checking components for serviceability
 - 10. tightening fastenings to the required torque
 - 11. setting, aligning and adjusting replaced components
 - 12. making 'off-load' checks before re-pressurising the system
 - 13. priming and bleeding the system (where applicable)
 - 14. functional/performance testing of the maintained system
4. Carry out maintenance activities to component level on all of the following fluid power components:
- 1. pumps
 - 2. valves
 - 3. cylinders
 - 4. actuators
5. Replace/refit a range of fluid power components, to include ten of the following:
- 1. pumps
 - 2. motors
 - 3. compressors
 - 4. sensors
 - 5. pistons
 - 6. bearings
 - 7. receivers
 - 8. lubricators
 - 9. filters
 - 10. spools
 - 11. reservoirs
 - 12. gaskets and seals
 - 13. regulators
 - 14. valves
 - 15. accumulators
 - 16. pipework
 - 17. hoses/tubing
 - 18. valve solenoid
 - 19. actuators/cylinders
 - 20. pressure intensifiers
 - 21. switches
 - 22. other specific components
6. Maintain fluid power equipment, in compliance with one of the following:
- 1. organisational guidelines and codes of practice
 - 2. BS, ISO and/or BSEN standards
 - 3. equipment manufacturers' operation range

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7. Complete and store all relevant maintenance documentation in accordance with organisational requirements, using one of the following:
 1. job cards
 2. maintenance log or report
 3. permit to work/formal risk assessment and/or sign on/off procedures
 4. organisational-specific documentation
 5. electronic reports

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