

## Install and maintain hydraulic systems on wind turbines

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### Overview

This national occupational standard defines the competence required to install, test and maintain hydraulic systems on wind turbines. It also requires competence in reading and interpreting technical drawings.

The standard is for those responsible for installing and maintaining hydraulic systems on wind turbines whether they are situated onshore or offshore and requires knowledge and competence of the use of a variety of mechanical methods.

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### Performance criteria

*You must be able to:*

#### **General**

1. Identify the hydraulic system to be isolated by interpreting system plans and using available information.
2. Select and wear the PPE required to carry out the isolation activity.
3. Apply isolations and prove for dead in accordance with local isolation procedures.
4. Carry out a site-specific risk assessment of the work area, identifying the hazards and implementing the control measures required.
5. Maintain accurate and up to date records.
6. Report information and data to the designated person.

#### **Maintain Hydraulic Systems on Wind Turbines**

7. Use and interpret technical drawings.
8. Check all aspects of the operation of a hydraulic system and identify faults.
9. Undertake checks and routine activities as part of a planned maintenance programme.
10. Install a system to comply with manufacturer and company requirements.
11. Commission the hydraulic system and confirm safe and correct working.
12. Carry out the operation, troubleshooting and commissioning of PLC and Safety Controllers
13. Carry out inspection, testing and fault finding on fluid power systems.
14. Strip a system to component level and repair or replace as required.
15. Confirm that the completed task meets expected Company procedures.
16. Clean and store equipment safely and securely and leave the work area in a safe condition in accordance with Company procedures.
17. Carry out all work in accordance with industry standards and legislation.

#### **Mechanical Specific**

18. Safely dismantle, assemble and tension:
  - a) bolted connections.
  - b) hydraulically torque bolted connections.
19. Inspect and check components and fittings.

20. Check and confirm that work complies to related specifications, methods, process, techniques and company and manufacturers requirements.
21. Carry out drive alignment using hand tools.

## Knowledge and understanding

*You need to know and understand:* **General**

1. The principles of health, safety and environmental legislation and regulations when maintaining hydraulic systems, including COSHH requirements.
2. The organisation's safety rules, policies and procedures when carrying out work on hydraulic systems.
3. The hazards associated with hydraulic systems, including portable systems, and the means by which they are minimised.
4. How to select, inspect and use PPE when carrying hydraulic system maintenance.
5. How to carry out a site specific risk assessment and identify workplace hazards.
6. Assessment of the role and criticality of the hydraulic system in relation to site and process.
7. How to identify different hydraulic motors and controllers.
8. The symbols that represent fluid power devices in circuit diagrams.
9. The identification of different types of valves, pipe work, sensors and actuators.
10. The identification of schematic symbols for hydraulic systems.
11. How Can-bus, Ethernet and Profinet networked systems work and interface with the hydraulic pressure pump.
12. How to respond in the event of an emergency situation in the workplace environment.
13. How to leave the work area in a safe and secure condition,
14. The company recording and reporting process.

### **Maintain Hydraulic Systems on Wind Turbines**

15. the principles of Hydraulic systems, including the construction and operation of fluid power devices.
16. the function of all hydraulic system components, including:
  - a) actuators
  - b) valves
  - c) accumulators
  - d) sensors
  - e) use of remote diagnostic tools to aid fault finding including HMI screens and SCADA systems
17. the function of different types of pumps and how to check start/stop

pressure of a pump.

18. De-pressurisation of a hydraulic system.

19. How to select and change system fluid, flushing when necessary.

20. How to select and change system filters.

21. Removal and replacement of static and dynamic seals.

22. The sequence to be adopted for the dismantling and reassembling of the equipment to both sub assembly and component level.

23. Methods of checking that components are fit for purpose.

24. How to change hydraulic hoses, fittings and pipe work.

25. How to adjust components and assemblies and flows and pressures to ensure they function correctly.

26. The correct means of disposal of contaminated waste from work on hydraulic systems.

27. The sections of current British Standards relevant to your work.

### **Mechanical Specific**

28. How to use measurement techniques including:

a) Vernier gauges

b) Micrometers

c) Calipers

29. The principles and regulations relating to torque and angular momentum.

30. Hand torque bolted connection techniques.

31. The cause and effect of good and bad drive alignment.

32. The principles of laser alignment, the laser equipment used for alignment and how to correctly use it.

33. The types of materials available and how to select material appropriate for the task.

34. How to recognise stress relaxation, fatigue and the effects of orientation.

35. The principles of lubrication and types of lubrication and application.

EUSWT11

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**Links to other NOS**

EUSWT03, EUSWT04, EUSWT05, EUSWT06, EUSWT07, EUSWT08,  
EUSWT09, EUSWT10

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