SEMME2017

Assisting in the testing of marine pipework systems

Overview

This standard identifies the competences you need to assist in the testing of ferrous, non-ferrous and non-metallic marine pipework systems, in accordance with approved procedures. Pipework systems to be tested include low pressure air, hydraulics, lubricating oil, fresh water, distilled water, waste water, chilled water, main service, fuel and steam. In preparing and testing the pipework system, you will be expected to use a range of hand tools, test equipment and techniques, as required by the test procedures. The testing activities will include processes such as purging equipment and materials, using appropriate test equipment (such as hydraulic, compressed air, gas and water) and the use of pressure gauges and leak repair equipment and materials.

Your responsibilities will require you to comply with organisational policy and procedures for the preparation and testing of the marine pipework and to report any problems with the testing equipment, testing activities or installations tested, that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work with either a high level of supervision or as a member of a team. You will take personal responsibility for your own actions and for the quality and accuracy of the work that you carry out. When working in a team you must demonstrate a significant personal contribution to the team activities in order to satisfy the requirements of the standard and competence in all the areas required by the standard must be demonstrated.

Your underpinning knowledge will be sufficient to provide a sound basis for your work and will provide an informed approach to applying marine pipework preparation and testing activities. You will have an understanding of the pipework system being tested and its application and will know about the preparations required, equipment to be used and tests to be carried out, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety precautions required when testing the pipework installation and with using the associated tools and equipment. You will be required to demonstrate safe working practices throughout and will understand the responsibility you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. follow the appropriate procedures for use of tools and equipment to carry out the required tests
3. assist in setting up and carrying out the tests using the correct procedures and within agreed timescales
4. record the results of the tests in the appropriate format
5. review the results and carry out further tests if necessary

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken when carrying out test procedures on pipework systems, used both on land and onboard vessels (including general workshop and site safety, accident procedure; statutory regulations, risk assessment procedures and COSHH regulations)
2. the importance of ship boundaries of testing and the tag-out system
3. the reasons for a `permit-to-pressure' test certificate, prior to testing onboard a vessel
4. the personal protective equipment (PPE) to be worn whilst carrying out the testing activities
5. the hazards associated with the testing activities and how they can be minimised
6. how to recognise and deal with emergencies and the procedures to be followed (such as methods of safely evacuating and closing down compartments in the case of fire or other major incident)
7. how to obtain and interpret information from job instructions, drawings and specifications, in relation to work undertaken
8. the colour code standard used for identifying pipes and why it is important to adhere to these standards
9. a basic understanding of the use of the pipe system being tested
10. the various pressure test methods used on ferrous, small bore non-ferrous and non-metallic pipelines
11. the importance of components being fitted in the correct relation to the direction of flow
12. the reasons for purging and venting pipework systems and the consequences of not purging the system
13. how to identify the fluids that can be used for flushing pipework systems
14. the consequences of not flushing, or of using the incorrect flushing agent
15. methods of testing the system and the need to gradually increase pressure in the pipework system
16. the methods used to isolate parts of the pipework system for testing and how this can be achieved
17. how the amount of test fluid for the pipework system is determined and what problems would be caused if the incorrect amount were used
18. the factors that govern the choice of test equipment used in the pressure

testing of pipework systems and the importance of equipment being calibrated
19. how the test pressures are determined
20. the reasons for maintaining test pressures for specific times
21.
how the results of the pressure test are analysed and why this is important
22.
how pipework systems are depressurised and what environmental precautions must be taken (especially in confined spaces onboard vessels)
23. why tool/equipment control is critical and what to do if a tool or piece of equipment is unaccounted for on completion of the activities
24. the procedures for recording and reporting test results to the relevant people
25. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve

Scope/range related to performance criteria

1.

Carry out all of the following during the testing activities:

1.1 use the correct test procedures and specifications
1.2 check that all tools and test equipment are within calibration date
1.3 obtain clearance/authority/permit to pressure test the installation
1.4 ensure that isolation and tag-out procedures are followed
1.5 ensure that safe working distance procedures are set up
1.6 erect relevant warning notices or safety signs
1.7 ensure that appropriate safety measures are taken to protect test personnel (such as guards, distance, incremental pressure tests)

2.

Assist in carrying out tests on two of the following types of pipework installations:

2.1 ferrous pipework
2.2 non-ferrous pipework
2.3 non-metallic pipework

3.

Assist in carrying out tests on three of the following pipe systems:

3.1 high/low pressure air
3.2 salt/raw water
3.3 distilled water
3.4 main services
3.5 hydraulic
3.6 waste water
3.7 steam drains
3.8 lubricating oil
3.9 fuel
3.10 hot/cold fresh water
3.11 chilled water
3.12 deck drains
3.13 air conditioning
3.14 fire main
3.15 refrigeration gas
3.16 other salvage drainage systems

4.

Assist in the preparation of the installation for testing by carrying out all of the following:

4.1 checking the security of all joints
4.2
purging or flushing the system (as appropriate)
4.3
fitting appropriate blanking plugs/plates to exposed ends of pipe or equipment

4.4 connecting an appropriate test source
4.5 fitting leak detection equipment and or pressure gauges

5.

Use one of the following types of equipment for the testing:

5.1 hydraulic test equipment
5.2 gas test equipment
5.3 compressed air test equipment
5.4 water test equipment
5.5 non destructive testing (such as dye penetration)

6.

Assist in dealing with two of the following types of complexity:

6.1 systems with no faults
6.2 systems with faults
6.3 systems with intermittent faults

7.

During the tests, assist in the use of two of the following fault finding techniques:

7.1 half-split technique
7.2 input/output technique
7.3 six point technique.
7.4 standard substitution

8.

Assist in carrying out all of the following, during the testing activities:

8.1 filling the system with the appropriate test medium
8.2 venting air from the system (where appropriate)
8.3 applying test pressures in incremental stages
8.4 checking for leaks at each stage
8.5 depressurising the system
8.6 draining down the system (where appropriate)

9.

Record the test results in an appropriate format, to include one from the following:

9.1 system/installation test documentation
9.2 vessel, craft, or structure log
9.3 job sheet
9.4 handover report
9.5 corrective action report

10.

Carry out the testing activities, in accordance with one of the following standards:

10.1 BS, EN or ISO standards and procedures
10.2 customer (contractual) standards and requirements
10.3 company standards and procedures
10.4 specific system requirements
10.5 recognised compliance agency/body's standards
10.6 other accepted international standards

Behaviours

You will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as:

- strong work ethic
- positive attitude
- team player
- dependability
- responsibility
- honesty
- integrity
- motivation
- commitment

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