Overview

This standard identifies the competences you need to assemble ferrous marine pipework by mechanical means, in accordance with approved procedures. The pipework systems being assembled could include main steam, auxiliary steam, main feed, steam drains, fuel systems and drain systems. In producing the assemblies, you will be expected to select and use a range of equipment, hand tools and techniques, appropriate to the operations being performed.

The assembly activities could include producing threads on the external ends of the pipe, using stocks and dies or threading machines and joining the pipes using a range of fittings, which could include flanges and gaskets, straight couplings, elbows, tee pieces, reduction pieces and other fittings, as appropriate to the application.

Your responsibilities will require you to comply with organisational policy and procedures for the ferrous pipework assembly activities undertaken and to report any problems with the equipment, materials or assembly activities that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will be expected to work with a minimum of 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 assembly procedures to marine ferrous threaded pipework. You will understand the pipework assembly and its application and will know about the threaded pipework assembly process, components and materials used, in adequate depth to provide a sound basis for carrying out the activities, correcting faults and ensuring that the work output is produced to the required specification.

You will understand the safety precautions required when working on marine ferrous pipework assembly activities and with 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, both ashore and on board vessels.
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 relevant instructions, assembly drawings and any other specifications
3. ensure that the specified components are available and that they are in a usable condition
4. use the appropriate methods and techniques to assemble the components in their correct positions
5. use specified connectors and securing devices to secure the components
6. produce pipework assemblies to the required specification
7. check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification
8. deal promptly and effectively with problems within your control and report those that cannot be solved
Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken when assembling ferrous marine threaded pipework and with the tools and equipment that are used, both on land and on board vessels (including general workshop and site safety, accident procedure; statutory regulations, risk assessment procedures and COSHH regulations)
2. the personal protective equipment (PPE) to be used when assembling ferrous marine threaded pipework
3. the hazards associated with the ferrous marine threaded pipework assembly activities (such as handling long lengths of pipe, using pipe threading machinery, handling of sealing agents) and how they can be minimised
4. how to extract and use information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS or ISO standards) in relation to work undertaken
5. how to interpret first and third angle drawings, imperial and metric systems of measurement, work reference points and system of tolerancing
6. how to carry out currency/issue checks of the specifications you are working with
7. the preparation of pipework and fittings for the assembly operation (checking for damage, removing foreign objects, dirt and swarf from bore of pipe, removing burrs)
8. the range of pipe fittings that can be used and how to identify them (straight connectors, elbows, tee pieces, reduction pieces, flanged fittings, valves, blanking pieces/cap ends)
9. how to determine the overall length of the pipework required, taking into account allowances for pipe fittings and threaded connections
10. how to produce threads on the pipe ends and the tools and equipment that can be used (to include stocks and dies, pipe threading machines)
11. methods used to seal threaded joints (such as tapes and sealing compounds)
12. the use of flanges to connect pipes; use of gaskets; and torque loading of flange bolts
13. how to identify the correct orientation of fittings with regard to flow
14. the methods used to handle and support pipework during assembly
15. the type of fittings that are used for securing pipework assemblies to ship structures
16. the tools and equipment used when assembling pipework
17. the standards to be attained and company quality procedures
18. the procedure for the safe disposal of waste materials
19. the recording documentation to be completed for the marine pipe bending and forming activities undertaken and where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation
20. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve
1. Carry out all of the following during the ferrous pipework assembly activities:
   1.1 use the correct pipework assembly drawings, specifications or job instructions
   1.2 ensure that appropriate COSHH regulations are adhered to
   1.3 check that all tools and equipment are in a safe and usable condition
   1.4 ensure that components and pipes are free from foreign objects, dirt or other contamination
   1.5 leave the work area in a safe and tidy condition on completion of the activities

2. Assemble pipes and components to form four of the following marine pipework systems:
   2.1 main steam
   2.2 main feed
   2.3 fuel systems
   2.4 auxiliary steam
   2.5 steam drains
   2.6 drain systems
   2.7 sea water cooling
   2.8 main fire systems
   2.9 air systems
   2.10 air vent/sounding tubes

3. Prepare for the pipe assembly activities, to include carrying out all of the following:
   3.1 cutting pipes to length, with appropriate allowance (such as for threading, flaring and wall forming)
   3.2 selecting and setting up dies in stocks or forming machines
   3.3 cutting form ends on pipe ends to the appropriate length
   3.4 checking that the completed forms have the required thread

4. Assemble formed pipework, using six of the following:
   4.1 straight couplings
   4.2 flanges
   4.3 drain/bleeding devices
   4.4 elbows
   4.5 reduction pieces
   4.6 blanking caps
   4.7 tee pieces
   4.8 valves

5. Produce assembled pipework which contains two of the following features:
   5.1 angular bends
   5.2 offsets
   5.3 bridge sets
   5.4 expansion loops

6. Assemble pipework, to include carrying out all of the following:
   6.1 connecting pipe to pipe
   6.2 aligning and levelling of pipework
   6.3 connecting pipe to ship's equipment
   6.4 securing and fitting pipework supports to ship structures
   6.5 using gaskets, seals or jointing compounds
   6.6 torque loading of bolts
6.7 attaching identification markers of pipe contents (such as colour coding, labels)

7. Produce pipework assemblies which comply with one of the following standards:
7.1 BS or ISO standards and procedures
7.2 company standards and procedures
7.3 specific system requirements
7.4 customer (contractual) standards and requirements
7.5 recognised compliance agency/body's standards
7.6 other accepted international standards
Behaviours

**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
Assembling ferrous marine pipework by mechanical means

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