

## Joining non-metallic marine pipework

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### Overview

This standard identifies the competences you need to assemble and join non-metallic marine pipework, in accordance with approved procedures. The pipework systems being assembled will include fresh water, salt/raw water, chilled water, air conditioning, waste water, deck drains and other salvage drainage systems. In producing the assemblies, you will be expected to use a range of equipment, hand tools and techniques, appropriate to the operations being performed.

The assembly and joining activities include producing cemented/glued joints, welding, compression joints and push-fit joints. The pipe assemblies produced will use a range of fittings, which will include straight connectors, elbows, tee pieces, reduction pieces, flanges, tank connectors, tap connectors, valves and other fittings, as appropriate to the application.

Your responsibilities will require you to comply with organisational policy and procedures for the marine pipework assembly activities undertaken and to report any problems with the equipment, materials or pipe assembly activities that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work to instructions, either alone or in conjunction with others, taking personal 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 marine non-metallic pipework assembly procedures. You will have an understanding of the pipework assembly and its application and will know about the assembly techniques, pipe components and materials used, 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 working on the 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.

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### 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. join the components using the specified connectors and securing devices
6. check the completed pipework assembly to ensure that all operations have been completed and the finished assembly meets the required specification
7. deal promptly and effectively with problems within your control and report those that cannot be solved

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## Knowledge and understanding

## You need to know and understand:

1. the specific safety precautions to be taken when assembling non-metallic marine pipework, and with the tools and equipment that are used in the workplace and onboard 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 non-metallic marine pipework
3. the hazards associated with the non-metallic marine pipework assembly activities (such as handling long lengths of pipe, using hot air/gas torches, plastic welding heating elements, handling adhesives and sealing agents) and how they can be minimised
4. how to obtain and interpret information from job instructions, drawings and specifications, in relation to the work undertaken
5. the preparation of pipework and fittings for the assembly operation (such as checking for damage, removing foreign objects, dirt and swarf from bore of pipe, removing burrs)
6. the range of pipe fittings that can be used and how to identify them (to include straight connectors, elbows, tee pieces, reduction pieces, tank fittings, valves, blanking pieces/cap ends, flange)
7. the different types of fittings available (such as cemented/glued fittings, compression fittings and push-fit fittings, plastic welding, swaged)
8. how to determine the overall length of the pipework required, taking into account allowances for pipe fittings
9. how to ensure correct alignment and identify the correct orientation of fittings with regard to flow and the consequences of incorrectly orientating the fitting
10. the methods used to prepare pipe ends and fittings when using adhesives and why it is necessary to ensure that these preparations are carried out
11. the tools and equipment used when assembling pipework
12. the methods used to glue the joints and how to recognise when the fitting is correctly secured
13. the various adhesives and sealing compounds that are used on non-metallic pipework
14. the precautions to be taken when using the adhesives and sealing compounds (such as adequate ventilation especially in confined spaces, away from naked flames, avoiding skin contact)
15. the precautions to be taken when using hot air/gas torches to form the joint and the effect of overheating the joint
16. the principles of sealing and use of compression fittings and the effects of over-tightening the fittings
17. the use of push-fit connectors and their advantages and disadvantages

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18. the methods used to handle and support pipework during assembly
19. the types of fittings that are used for securing pipework assemblies to marine structures
20. 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
21. the standards to be attained and company quality procedures
22. the procedure for the safe disposal of waste materials
23. the recording documentation to be completed for the marine pipe joining activities undertaken and where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation
24. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve

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### Scope/range related to performance criteria

1. Carry out all of the following during the pipe assembly activities:
  1. use the correct pipe assembly drawings, specifications or job instructions
  2. ensure that appropriate COSHH regulations are adhered to
  3. check that all tools and equipment are in a safe and usable condition
  4. ensure that the components and pipes used are free from foreign objects, dirt or other contamination
  5. leave the work area in a safe condition on completion of the activities
2. Join pipes and pipework components to form two of the following marine pipe systems:
  1. fresh water
  2. salt/raw water
  3. waste water
  4. chilled water
  5. deck drains
  6. air conditioning
  7. fuel
  8. lubrication/oil
  9. steam drains
  10. hydraulic
  11. fire main
  12. refrigeration gas
  13. other salvage drainage systems
3. Cut pipes to length and join them using two of the following methods:
  1. compression fittings
  2. snap-on/push fittings
  3. cemented/glued fittings
  4. plastic hot welding
  5. swaged flexible
4. Produce pipework assemblies which contain four of the following types of fittings:

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1. straight couplings
  2. elbows
  3. tee pieces
  4. reduction pieces
  5. valves
  6. blanking caps
  7. drain/bleeding devices
  8. screwed fittings (such as tank, tap, pump, gauges)
  9. flanged
  10. other specific fitting
5. Produce assembled pipe work which contains two of the following features:
1. angled bends
  2. offsets
  3. bridge sets
  4. other specific feature
6. Join pipework, to include carrying out all of the following:
1. connecting pipe-to-pipe
  2. aligning and levelling of pipework
  3. connecting pipe to ship's equipment
  4. securing and fitting pipework supports to marine structures
  5. using gaskets, seals or jointing compounds
  6. torque loading of connections
  7. attaching identification markers of pipe contents (such as colour coding, labels)
7. Produce pipework assemblies, in accordance with one of the following standards:
1. BS, EN or ISO standards and procedures
  2. customer (contractual) standards and requirements
  3. company standards and procedures
  4. specific system requirements
  5. recognised compliance agency/body's standards
  6. other accepted international standards

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### 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

## Joining non-metallic marine pipework

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