SEMME3046

Producing socket and flange fillet welded joints in pipe using a manual welding process

Overview

This standard identifies the competences you need to produce socket and flange fillet welded joints in pipe, using a manual welding process such as manual metal arc (MMA), MIG, MAG, TIG, flux cored wire, plasma or oxy/fuel gas welding equipment, in accordance with instructions and/or approved welding procedures. You will be required to check that all the workholding equipment and manipulating devices required are available and are in a usable condition. You will be expected to check the welding equipment to ensure that all the leads/cables, hoses and wire feed mechanisms are securely connected and are free from damage.

In preparing to weld, you will need to set and adjust the welding conditions, in line with the instructions or welding procedure specification. You must operate the equipment safely and correctly, and make any necessary adjustments to settings, in line with your permitted authority, in order to produce the welded joints to the required specification. You will be required to demonstrate your capability to produce the fillet welds to the required quality, and this could be through tests according to BS 4872 or EN 287-1 or EN9606-1.

Your responsibilities will require you to comply with organisational policy and procedures for the welding activities undertaken and to report any problems with the welding activities or equipment that you cannot resolve, or are outside your permitted authority, to the relevant people. You will be expected to work to instructions, taking personal responsibility for your own actions and for the quality and accuracy of the work that you produce.

Your underpinning knowledge will be sufficient to provide a sound basis for your work and will provide an understanding of how the particular welding process works. You will know about the equipment, materials and consumables, in adequate depth to provide a sound background for the welding operations to be performed and for ensuring that the work output is produced to the required specification.

You will understand the safety precautions required when working with the welding 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 relevant joining procedure and job instructions
3. confirm that the joint preparation complies with the specification
4. confirm that joining and related equipment and consumables are as specified and fit for purpose
5. make the joints as specified using the appropriate thermal joining technique
6. produce joints of the required quality and of specified dimensional accuracy
7. shut down the equipment to a safe condition on completion of joining activities
8. deal promptly with excess and waste materials and temporary attachments, in line with approved and agreed procedures
9. deal promptly and effectively with problems within your control and report those that cannot be solved
10. complete relevant documentation in line with organisational procedures

Knowledge and understanding

You need to know and understand:

1. the safe working practices and procedures to be observed when working with the selected welding equipment used, both on land and on board vessels (including general workshop and site safety, appropriate personal protective equipment (PPE), fire prevention, protecting other workers from arc eye, safety in enclosed/confined spaces, fume control, accident procedure, statutory regulations, risk assessment procedures and COSHH regulations) 2. the correct handling and storage of gas cylinders (including manual handling and use of cylinder trolley, leak detection procedures, relevant BCGA codes of practice, cylinder identification, gas pressures, cylinder and equipment safety features, emergency shutdown procedures) 3. the hazards associated with the selected welding process (including live electrical components, poor earthing, arc radiation, fumes and gases, gas supply leaks, spatter, hot slag and metal, elevated working, enclosed spaces, slips, trips and falls) and how they can be minimised 4. the manual welding process selected and an awareness of the different types of welding equipment (including basic principles of fusion welding, AC and DC power sources, ancillary equipment, power ranges, care of equipment, terminology used in welding, flame setting) 5. how to extract the information required from drawings and welding procedure specifications (including the interpretation of welding symbols, scope, content and application of the welding procedure specification) 6. the importance of complying with job instructions and the welding procedure specification 7. how to carry out currency/issue checks of the specifications you are working with 8. the consumables associated with the chosen welding process (including types of electrodes and/or filler metal and their application, types of shielding gas and their application, gas supply and control, correct storage and drying of electrodes and filler wire) 9. the types and features of welded joints in pipe (including fillet and butt welds, single and multi-run welds, welding positions, weld quality) 10. methods of setting up and restraining the joint to achieve correct location of components and control of distortion (including edge preparation, use of jigs and fixtures, manipulators and positioners, tack welding size and spacing in relationship to material thickness and component size, use of temporary attachments, pre-setting) 11. preparing the welding equipment and the checks to be made to ensure that it is safe and ready to use (including electrical connections, earthing arrangements, equipment calibration, setting welding parameters) 12. the techniques of operating the welding equipment to produce a range of joints in the various joint positions (including fine tuning parameters, correct manipulation of the welding gun or electrode, safe closing down of the welding equipment) 13. problems that can occur with the welding activities and how these can be overcome (including causes of distortion and methods of control, effects of welding on materials, sources of weld defects and methods of prevention) 14. the organisational quality systems used and weld standards to be achieved; weld inspection and test procedures used (including visual and non-destructive tests) 15. personal approval tests and their applicability to your work 16. the calibration/care and control procedures for tools and equipment 17. the procedure for the safe disposal of waste materials 18. 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.

Prepare for the pipe welding process, to include carrying out **all** of the following:

1.1 obtaining the appropriate equipment for the welding activities to be carried out
1.2 checking the condition of, and correctly connecting, welding leads, earthing arrangements and electrode holder (where appropriate)
1.3 connecting all required hoses, regulators and/or flow meters and safety devices (where appropriate)
1.4 setting and adjusting welding conditions/parameters, in accordance with welding procedure specification
1.5 preparing the work area for the welding activities (such as placing welding screens, positioning fume extraction equipment)
1.6 ensuring that the components are correctly set up with regard to specified joint preparation and is secure
1.7 obtaining and wearing appropriate personal protective equipment

2.

Set up, check, adjust and use welding and related equipment for **one** of the following welding processes:

2.1 manual metal arc
2.2 MIG/MAG
2.3 TIG
2.4 cored wire
2.5 plasma
2.6 oxy/fuel gas welding

3.

Use consumables appropriate to the material and application, to include:

either **two** types of electrode from:

1. rutile
2. basic
3. cellulosic
4. nickel alloy
5. aluminium
6. stainless
7. other specific type

or

8. two types of filler wire from different material groups

1.

Produce socket and flange fillet welded joints in **one** of the following:

1.1 small bore pipe (50mm outside diameter or less)
1.2 large bore pipe (above 50mm outside diameter)

2.

Weld joints according to BS EN ISO 6947, in good access situations, in **four** of the following positions:

2.1 flat (PA) rotating
2.2 horizontal vertical (PB) fixed
2.3 horizontal vertical (PB) rotating
2.4 vertical upwards (PF) fixed
2.5 vertical down (PG) fixed
2.6 horizontal overhead (PD) fixed

3.

Produce marine socket and flange fillet welded joints in pipe, which comply with **all** of the following:

3.1 achieve minimum weld quality requirements applicable to fillet welds equivalent to those given in the relevant European/International Standards (such as BS EN ISO 5817 and EN 30042/ISO 10042) as required by the application standard or specification
3.2 meet the required dimensional accuracy within specified tolerance

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

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