

Joining materials by the manual oxy/fuel gas welding process

Overview

This standard identifies the competencies you need to prepare and operate manual oxy/fuel gas-welding equipment, in accordance with instructions and/or approved welding procedures. You will be required to check that all the workholding and manipulating devices required are available and in a usable condition. You will be expected to check the welding equipment to ensure that the regulators, hoses, flashback arrestor and welding torch are securely connected and are free from leaks or damage. In preparing to weld, you will need to set and adjust the gas pressures/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.

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 equipment, or welding activities that you cannot resolve, or are outside your permitted authority, to the relevant people. You will be expected to work to instructions, 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 be sufficient to provide a sound basis for your work, and will provide an understanding of how the oxy/fuel gas 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 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.

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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 joining procedure and job instructions
3. check that the joint preparation complies with the specification
4. check 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

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Knowledge and understanding

You need to know and understand:

1. the safe working practices and procedures to be observed when working with oxy/fuel gas welding equipment (general workshop and site safety, appropriate personal protective equipment (PPE), fire and explosion prevention, protecting other workers, safety in enclosed/confined spaces; fume control; accident procedure; statutory regulations; risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials)
2. the correct handling and storage of gas cylinders (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 oxy/fuel gas welding (naked flames, fumes and gases, explosive gas mixtures, oxygen enrichment, spatter, hot slag and metal, grinding and mechanical slag removal, elevated working, enclosed spaces, slips trips and falls), and how they can be minimised
4. the welding process (including basic principles of oxy/fuel gas welding and related equipment)
5. how to care for the welding equipment used
6. the consumables associated with oxy/fuel gas welding (types of filler wire, fluxes, gas supply and control)
7. the types of welded joints to be produced (fillet and butt welds, single and multi-run welds, welding positions, joints in sheet, pipe and plate)
8. setting up and restraining the joint (the use of jigs/fixtures, manipulators and positioners, restraining devices, tack welding size and spacing in relationship to material thickness, correct joint set-up, cleanliness of materials used)
9. preparing the welding equipment, and checks that need to be made to ensure that it is safe and ready to use (connection of hoses, torch, flashback arrestors, hose check valves, regulators, connections for leaks, setting welding parameters)
10. the techniques of operating the welding equipment to produce a range of joints in the various joint positions (selection of nozzle, flame adjustment, correct manipulation of torch and filler rods, safe closing down of the welding equipment)
11. the importance of complying with job instructions and the welding procedure specification
12. how to use and extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate British, European or relevant International standards in relation to work undertaken)

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13. problems that can occur with the welding activities and how these can be overcome (causes of distortion and methods of control, effects of welding on materials and sources of weld defects; methods of prevention)
14. the organisational quality systems used and weld standards to be achieved; weld inspection and test procedures used (including visual, mechanical and non-destructive tests)
15. personal approval tests and their applicability to your work
16. the extent of your own authority and whom you should report to if you have problems that you cannot resolve
17. reporting lines and procedures, line supervision and technical experts

Scope/range related to performance criteria

1. Prepare the oxy/fuel gas welding equipment for use, to include all of the following:
 1. checking regulators, hoses and valves are securely connected and free from leaks and damage
 2. checking/fitting the correct gas nozzle to the torch
 3. checking that a flashback arrestor is fitted
 4. setting appropriate gas pressures
 5. using the correct procedure for lighting, adjusting and extinguishing the welding flame
 6. using appropriate and safe procedures for handling and storing of gas cylinders
2. Use a range of filler wire, to include **both** of the following:
 1. two different sizes
 2. two different filler wire properties/composition
3. Produce welded joints which incorporate the following:
 1. butt welds and
 2. fillet welds OR welds made autogenously (without filler wire)
4. Produce joints in **one** form of specified materials from the following:
 1. plate
 2. pipe/tube
 3. sheet (<3mm)
 4. section
 5. other specific forms
5. Weld joints according to approved welding procedures, and in good access situations, in **two** of the following BS EN ISO 6947 ****positions**:
 1. flat (PA)
 2. vertical upwards (PF)
 3. horizontal (PC)
 4. vertical downwards (PG)
 5. horizontal vertical (PB)
6. Produce welded components which:
 1. achieve a minimum weld quality equivalent to the level given in the relevant standard (such as BS EN ISO 5187 or BS EN

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- ISO 10042) required by the application standard or specification
- 2. meet and verify the required dimensional accuracy within specified tolerance

Behaviours

Additional Information

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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