
Overview

This standard identifies the competences you need to produce fillet and butt tack welds in plate or section materials, using manual welding processes such as manual metal arc (MMA), MIG, MAG, TIG, Plasma or cored wire welding equipment, in a marine environment, in accordance with instructions and/or approved welding procedures. You will be expected to produce welds using one welding process. 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 set up the welding equipment, ensuring that all the leads/cables, hoses and wire feed mechanisms are securely connected and free from damage. In preparing to weld, you will need to set and adjust the welding conditions, in line with the welding procedure specification. You must operate the equipment safely and correctly and make any necessary adjustments to settings in order to produce the welded joints to the required specification. The tack welds produced will satisfy the requirements of BS EN 287.

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 personally resolve, or 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 manual arc welding procedures and instructions. You will understand the welding process used and its application and will know about the equipment, materials and consumables used, in adequate depth to provide a sound basis for setting up and operating the equipment, recognising and correcting faults and ensuring that the work output is 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:

- P1 work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
- P2 follow the relevant joining procedure and job instructions
- P3 check that the joint preparation complies with the specification
- P4 check that joining and related equipment and consumables are as specified and fit for purpose
- P5 make the joints as specified using the appropriate thermal joining technique
- P6 produce joints of the required quality and of specified dimensional accuracy
- P7 shut down the equipment to a safe condition on completion of joining activities
- P8 deal promptly with excess and waste materials and temporary attachments, in line with approved and agreed procedures
- P9 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:

- K1 the safe working practices and procedures to be observed when working with the selected welding equipment (such as general workshop and site safety; appropriate personal protective equipment (PPE); fire prevention; protecting other workers from the effects of the welding arc; safety in enclosed/confined spaces; fume control; accident procedure; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations)
- K2 the correct handling and storage of gas cylinders (to include 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)
- K3 the hazards associated with the selected welding process (such as live electrical components, poor earthing, arc radiation, fumes and gases, gas supply leaks, spatter, hot slag and metal; grinding and mechanical metal/slag removal; elevated working; enclosed spaces; slips, trips and falls) and how they can be minimised
- K4 the manual/semi-automatic welding process selected and the different types of welding equipment (such as basic principles of fusion welding, AC and DC power sources, ancillary equipment, power ranges, care of equipment, terminology used in welding, flame setting)
- K5 extracting information required from drawings and welding procedure specifications (to include interpretation of welding symbols, scope, content and application of the welding procedure specification)
- K6 the consumables associated with the chosen welding process (to include types of electrodes and or filler metal and their application; types of shielding gas and their application, gas supply and control; correct control, storage and drying of electrodes and filler wire)
- K7 the types and features of tack welded joints in plate, fillet and butt welds (such as single and multi-run welds, welding positions, weld quality)
- K8 methods of setting up and restraining the joint, to achieve correct location of components and control of distortion (such as 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)
- K9 preparing the welding equipment and the checks to be made to ensure that it is safe and ready to use (to include electrical connections, power return and earthing arrangements; equipment calibration, setting welding parameters)
- K10 the techniques of operating the welding equipment to produce a range of joints in the various joint positions (to include fine tuning

- parameters, correct manipulation of the welding gun or electrode, safe closing down of the welding equipment)
- K11 the importance of complying with job instructions and the welding procedure specification
- K12 problems that can occur with the welding activities and how these can be overcome (such as causes of distortion and methods of control, effects of welding on materials and sources of weld defects; methods of prevention)
- K13 the organisational quality systems used and weld standards to be achieved
- K14 the weld inspection and test procedures used (including visual and non-destructive tests)
- K15 personal approval tests and their applicability to your work
- K16 the procedure for the safe disposal of waste materials
- K17 the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve

Additional Information

Scope/range related to performance criteria

You must be able to:

1. Prepare for the manual welding process, to include carrying out **all** of the following:
 - 1.1. obtaining the appropriate equipment for the welding activities to be carried out (such as type, current capacity)
 - 1.2. checking condition of and correctly connecting, welding leads, earthing arrangements and electrode holder
 - 1.3. connecting all required hoses, regulators and/or flow meters and safety devices (where applicable)
 - 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 workpiece/component is correctly set up with regard to the specified joint preparation and that it is secure
 - 1.7. obtaining and wearing appropriate personal protective equipment
2. Use **one** of the following manual/semi-automatic welding processes:
 - 2.1. manual metal arc
 - 2.2. MIG/MAG
 - 2.3. TIG
 - 2.4. plasma arc
 - 2.5. cored wire
3. Use consumables specified in the welding procedure specification for **one** of the following:
 - 3.1. butt welds (single sided or double sided)
 - 3.2. fillet welds
4. Produce butt or fillet tack welds in **one** the following types of material:
 - 4.1. carbon range of steel plate
 - 4.2. stainless plate
 - 4.3. non-ferrous plate
5. Produce tack welded joints, according to approved welding procedures, in the **following** BS EN ISO 6947 positions:
 - 5.1. vertical upwards (PF)

and **two** other positions chosen from:

- 5.2. flat (PA)
 - 5.3. horizontal (PC)
 - 5.4. horizontal vertical (PB)
 - 5.5. vertical downwards (PG)
 - 5.6. overhead (PE or PD)
6. Produce tack welded components which include **both** of the following:
- 6.1. satisfy the requirements of BS EN 287
 - 6.2. meet the required dimensional accuracy, within specified tolerance

SEMME3063 - HY1M 04

Tack welding marine plate using a manual/semi-automatic welding process

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