

SEMFWE3-16 SQA Unit Code H1WF 04

Welding materials with mechanised arc welding equipment



Overview

This standard identifies the competencies you need to operate one type of mechanised MIG/MAG, cored wire, Submerged Arc, TIG, or Plasma Arc welding installation, which has already been prepared for production in accordance with approved instructions, or welding procedures. You will be expected to check that the equipment has been approved for production and that sufficient supplies of all the required materials and consumables are present and correct, and ready for production operations to be performed.

You must operate the installation safely and correctly in accordance with instructions and approved procedures and achieve a weld quality and tolerances that meet the product specification. The production output may be inspected by visual and non-destructive testing methods to check that the specified quality is being achieved. You must continuously monitor the operation of the installation, and make any necessary adjustments to equipment settings in line with your permitted authority in order to produce the welded joints to the required specification. Meeting production requirements will be an important issue and your production records must show consistent and satisfactory performance.

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

Your underpinning knowledge will provide a sound basis for your work, enabling you to adopt an informed approach to applying welding procedures and instructions. You will have an understanding of how the welding process works and is applied in mechanised form, and will know about the equipment, materials and consumables in adequate depth to provide a sound background to the process operation and for carrying out the welding activities to the required specification. You will understand the safety precautions required when working with the machine and its 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:*
- P1 work safely at all times, complying with health and safety and other relevant regulations and guidelines
 - P2 follow the relevant joining procedure and work instructions
 - P3 confirm that the machine is set up and operating correctly, ready for the joining operations to be carried out
 - P4 check that the parent material, components, consumables and joint preparation comply with specifications
 - P5 carry out and monitor the machine operations in accordance with specifications and job instructions
 - P6 achieve joints of the required quality and specified dimensional accuracy
 - P7 make sure that the rate of output is as specified
 - P8 deal promptly and effectively with problems within your control and report those that you cannot solve
 - P9 shut down the equipment to a safe condition on conclusion of the joining activities

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Knowledge and understanding

You need to know and understand:

- K1 the safe working practices and procedures to be observed when operating mechanised arc welding installations (working with machinery; the use of personal protective equipment (PPE); protecting others from the effects of the electric arc; appropriate machine guards; operation of machine safety devices; stopping the machine in an emergency; closing the machine down on completion of activities; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials)
- K2 the hazards associated with arc welding machines and how they can be minimised (dangers from the electric arc; live electrical components; fumes and gases; hot metal; grinding and mechanical metal/slag removal; moving parts of machinery)
- K3 the principles of mechanised and automated welding (types of installations; machine functions; control systems; safety features)
- K4 the key components and features of the equipment used (power source; electrical parameters such as arc voltage, current, wire dispensing and feed mechanisms; flux dispensing and recovery; shielding gas supply; control and storage of consumables; how variations in the parameters influence weld features, quality and output)
- K5 extracting the necessary information from drawings and welding procedure specifications, welding symbols and abbreviations used (to include symbols and conventions to appropriate British, European or relevant International standards in relation to work undertaken)
- K6 operation of the machine controls and their function; care of equipment
- K7 setting up and aligning the workpiece, and the equipment to be used
- K8 monitoring the installation during the welding process; recognition of problems and action to be taken
- K9 problems that can occur with the welding activities (distortion, material and weld defects)
- K10 self inspection of completed work, methods and equipment to be used
- K11 organisational quality systems (standards to be achieved; production records to be kept)
- K12 personal approval tests and their applicability to your work
- K13 the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve

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Additional Information

Scope/range related to performance criteria

- You must be able to:*
1. confirm that the installation is ready for production operations to include checking **all** of the following:
 - 1.1 the installation has been approved for production
 - 1.2 supplies of components and consumables are adequate and correctly prepared
 - 1.3 machine settings comply with instructions and the welding procedure specification
 - 1.4 all machine functions operate correctly
 - 1.5 all safety equipment is in place and functioning correctly
 2. operate **one** of the following mechanised arc welding processes in the specified materials, forms and positions:
 - 2.1 MIG/MAG
 - 2.2 Submerged Arc
 - 2.3 Cored Wire
 - 2.4 Plasma Arc
 - 2.5 TIG
 3. produce welded components covering **both** of the following:
 - 3.1 two different joint configurations
 - 3.2 two different material groups
 4. monitor the process operation and machine functions, and make adjustments as required to parameters and mechanisms within your permitted authority and tolerances to include adjusting **all** of the following:
 - 4.1 electrical parameters
 - 4.2 welding speed
 - 4.3 flux dispensing and recovery mechanisms
 - 4.4 safety devices
 - 4.5 wire feed rate
 - 4.6 gas shielding system
 - 4.7 mechanical functions (handling, loading, workholding, transfer)
 5. produce welded components which:
 - 5.1 achieve a weld quality equivalent to the relevant level of BS EN ISO 5817 as required by the application standard (for aluminium, EN 30042/ISO 10042 applies)
 - 5.2 meet the required dimensional accuracy within specified tolerances

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