

SEMFWE3-30 - SQA Unit Code HF0J 34

Joining materials by resistance spot welding



Overview

This standard identifies the competencies you need to set up and use portable, and simple fixed spot welding machines in accordance with approved instructions, or welding procedures. You will be expected to check that the equipment is fit for purpose, the electrodes are correctly profiled, and that the component parts are in the correct condition for spot welding. In preparing the equipment you will need to set the welding current, welding and squeeze times and electrode pressure. You must operate the equipment safely and correctly and make any necessary adjustments to the equipment settings and parameters within permitted tolerances in order to achieve weld quality and tolerances that meet the specification.

Your responsibilities will require you to comply with organisational policy and procedures for the welding activities undertaken and to report any problems or adjustments to the equipment 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 of your work, enabling you to adopt an informed approach to applying spot welding procedures and instructions. You will have an understanding of how the resistance spot welding process works, 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 activities 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:*
- 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 specific safety precautions to be taken when operating resistance welding equipment (working with machinery, the use of appropriate personal protective equipment (PPE); the use of safety screens; operation of equipment safety devices; closing down the equipment on completion of the welding 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 resistance welding equipment and how they can be minimised (dangers from live internal electrical components, fumes, hot metal, expulsion of hot particles, moving parts of machines)
- K3 the basic principles of resistance welding (heat and pressure to form a weld heating effect of welding current; principal features of the welded joint; heat input; welding and pressure cycles; terminology used in welding)
- K4 the key components and features of the equipment used (power source; welding head; power range; electrical parameters such as arc voltage, current, electrode pressure and welding time; systems for parameter control; how variation in the parameters influence weld features, quality and output)
- K5 extracting information required from drawings and procedure specifications (to include symbols and conventions to appropriate British, European or relevant International standards in relation to work undertaken)
- K6 operation of the equipment controls and their function; equipment care procedures
- K7 monitoring the equipment during the welding process; fine tuning parameters to maintain quality; recognition of problems and action to be taken
- K8 problems that can occur with the welding activities, materials and weld defects
- K9 self inspection of completed work
- K10 organisational quality systems (standards to be achieved; production records to be kept)
- K11 personal approval tests and their applicability to your work
- K12 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. ensure the resistance spot welding equipment is fit for purpose by carrying out **all** of the following checks:
 - 1.1 equipment range is suitable for the operations to be performed
 - 1.2 portable equipment power leads are undamaged and securely connected
 - 1.3 electrodes are of the correct type, size and profile
 - 1.4 all equipment mechanical and electrical systems operate correctly
 - 1.5 supplies of components are adequate and suitably prepared
 - 1.6 appropriate safety screens are available
 2. set up, check, adjust and operate **one** of the following resistance spot welding machines:
 - 2.1 portable spot welding machines
 - 2.2 fixed simple spot welding machines
 3. set up the equipment parameters in accordance with instructions and the welding procedure specification to include setting **all** of the following:
 - 3.1 electrode tip diameter/profile
 - 3.2 welding current
 - 3.3 welding and squeeze times
 - 3.4 electrode pressure
 - 3.5 water cooling flow rate (as applicable)
 4. monitor the process operation and make adjustments to parameters in order to produce welded components covering **both** of the following:
 - 4.1 two different components
 - 4.2 two different material thicknesses
 5. produce welded components which meet **all** the following requirements:
 - 5.1 achieve a weld quality as specified in the application standard
 - 5.2 spot welds are correctly pitched out
 - 5.3 welded components meet the required dimensional accuracy within specified tolerances

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