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## Overview

This standard identifies the competences you need to assemble components for experimental vehicle development activities, using 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, that 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 the 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 that 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 enable 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 resistance spot 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 assembling procedure and work instructions
3. confirm that the machine is set up and operating correctly, ready for the assembling operations to be carried out
4. check that the parent materials, components, consumables and joint preparation comply with specifications
5. assemble components using the correct welding and joining techniques and methods
6. monitor the machine operations in accordance with specifications and job instructions
7. check the completed assembly to achieve joints of the required quality and specified dimensional accuracy
8. deal promptly and effectively with problems within your control and report those that you cannot solve
9. ensure that work records are completed, stored securely and available to others as per organisational requirements
10. leave the work area in a safe condition on completion of the activities, as per organisational and legal requirements

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## Knowledge and understanding

### You need to know and understand:

1. the specific safety precautions to be taken whilst carrying out the activities (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
2. the health and safety requirements of the work area and the activities, and the responsibility these requirements place on you
3. the hazards associated with the activities, and how to minimise them and reduce risks
4. the personal protective equipment and clothing (PPE) to be worn during the activities
5. 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)
6. 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)
7. how to extract the information required from drawings and welding procedure specifications
8. operation of the machine controls and their function; equipment care procedures
9. how to monitor the equipment during the welding process; fine tuning parameters to maintain quality; recognition of problems and action to be taken
10. the problems that can occur with the welding activities; materials and weld defects
11. self inspection of completed work
12. organisational quality systems (standards to be achieved; production records to be kept)
13. the extent of your own authority and to whom you should report if you have problems that you cannot resolve
14. how to access, use and maintain information to comply with organisational requirements and legislation

### Scope/range related to performance criteria

1. Carry out all of the following during the assembling and welding activities:
  1. obtain and use the appropriate documentation (such as job instructions, drawings, weld procedure specifications, quality control documentation)
  2. adhere to procedures or systems in place for risk assessment, hazardous substances, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
  3. check that all tools and equipment to be used are within current calibration/certification dates
  4. use safe and appropriate resistance welding methods and procedures at all times
  5. return all tools and equipment to the correct location on completion of the resistance welding activities
  6. leave the work area in a safe and appropriate condition on completion of the activities
  7. produce welded joints that meet the requirements of the specification
2. Ensure that the resistance spot welding equipment is fit for purpose, by carrying out all of the following checks before use:
  1. equipment range is suitable for the operations to be performed
  2. portable equipment power leads are undamaged and securely connected
  3. electrodes are of the correct type, size and profile
  4. all mechanical and electrical systems on the equipment operate correctly
  5. supplies of components are adequate and suitably prepared
  6. appropriate safety screens are available
3. Set up, check, adjust and operate one of the following resistance spot welding machines:
  1. portable spot welding machines
  2. fixed, simple spot welding machines
4. Set up the equipment parameters, in accordance with instructions and the welding procedure specification, to include setting all of the following:
  1. electrode tip diameter/profile

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2. welding current
  3. welding and squeeze times
  4. electrode pressure
5. Monitor the process operation and make adjustments to parameters, in order to produce welded components covering both of the following:
1. two different components
  2. two different material thicknesses
6. Check components meet all of the following requirements:
1. achieve a weld quality as specified in the application standard
  2. spot welds are correctly pitched out
  3. welded components meet the required dimensional accuracy within specified tolerance

SEMAUT3042

Assembling components for experimental vehicle engineering by  
resistance spot welding



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