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## Overview

This standard identifies the competences you need to prepare a resistance spot, seam or projection welding installation for production, in accordance with approved procedures. You will be required to set up and check both the welding equipment and all associated mechanical and electrical apparatus forming part of the mechanised or automated installation. This will include setting up of handling and loading equipment, workholding arrangements, traversing mechanisms, transfer mechanisms and safety equipment, as applicable to the machine type. In setting up the welding conditions, you will be expected to set the welding current, welding and squeeze times, electrode pressure cycle and welding speed for seam or spot pitch. You must produce trial welds and prove that the machine is working satisfactorily before declaring the equipment ready for production. Making adjustments to settings to achieve specification and solving machine-related problems during production, will also form part of your role.

Your responsibilities will require you to comply with organisational policy and procedures for setting up the welding installation and to report any problems with the welding activities or equipment that you cannot 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 resistance-welding procedures. You will understand the welding process carried out and its application and will know about the equipment, relevant materials and consumables, in adequate depth to provide a sound basis for setting up the equipment, correcting faults and ensuring that the work output is produced to the required specification.

You will understand the safety precautions required when working with the welding machine and with 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:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines 2. follow the relevant joining procedure specification and job instructions for the work to be produced 3. check that the equipment is as specified and in usable condition 4. obtain the required components and check that the joint preparation complies with the specification 5. set up the handling, workholding and associated equipment to achieve correct joint positioning 6. select and prepare the appropriate consumables in line with the joining 7. procedure specification 8. set and adjust the machine operating conditions to achieve joints of the required quality and within specified dimensional accuracy 9. check that all safety mechanisms are in place and that the equipment is operating satisfactorily 10. deal promptly and effectively with problems within your control and report those that cannot be solved 11. complete relevant documentation in line with organisational procedures

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## Knowledge and understanding

### You need to know and understand:

1. the specific safety precautions to be taken when setting and operating resistance welding installations (including working with machinery; the use of appropriate personal protective equipment (PPE); machine guards; operation of machine safety devices; stopping the machine in an emergency; closing down the machine on completion of the welding activities)
2. statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials
3. the hazards associated with resistance welding machines (such as dangers from live internal electrical components, fumes, hot metal, expulsion of hot particles, moving parts of machines) and how they can be minimised
4. the basic principles of resistance welding (including heat and pressure to join metals; heating effect of welding current; principle features of the welded joint; heat input; welding and pressure cycles; how variations in the parameters influences the weld features; terminology used in welding)
5. the key components and features of the resistance welding equipment used (including power source; welding head; power range; electrical parameters such as voltage, current, electrode pressure and welding time; systems for parameter control)
6. mechanised and automated resistance welding basics (including types of installation; machine functions; control systems; safety features; loading, handling, clamping and transfer of components)
7. how to extract the information from drawing and welding procedure specifications (to include symbols and conventions to appropriate British, European or relevant International standards in relation to work undertaken)
8. how to carry out currency/issue checks of the specifications you are working with
9. types of electrodes used in resistance welding, contact profiles and maintenance requirements of the electrodes
10. types of joints applicable to resistance welding and the surface preparation required
11. methods of setting up the joints to achieve the correct location of components (such as workholding arrangements; component location and contact)
12. setting up the welding equipment to the welding procedure

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- specification (such as setting welding conditions, time and pressure cycles; welding speed)
13. checking that the equipment functions to the required specification (such as running pre-production trials to prove that the installation is working satisfactorily)
  14. problems that can occur with the welding activities and how these can be overcome (including welding characteristics of relevant materials and sources of weld defects; methods of prevention)
  15. organisational quality systems (such as standards to be achieved; production records to be kept)
  16. personal approval tests and their applicability to your work
  17. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve

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## Scope/range related to performance criteria

1. Ensure that the resistance welding equipment is suitable for production, by carrying out all of the following checks:
  - 1.1. the equipment is correctly maintained and in a safe and usable condition
  - 1.2. the equipment is correctly calibrated
  - 1.3. all electrical and mechanical systems function smoothly
  - 1.4. equipment shut-down systems function correctly
2. Set up, check, adjust and use one of the following types of resistance welding installations:
  - 2.1. spot welding
  - 2.2. seam welding
  - 2.3. projection welding
3. Set up the welding installation and parameters, in accordance with the welding procedure specification, to include setting up all of the following, as applicable to the type of installation:
  - 3.1. welding current
  - 3.2. welding and squeeze times
  - 3.3. electrode pressure cycle
  - 3.4. welding speed (seam)
  - 3.5. weld pitch (spot)
4. Set up the workpiece to achieve correct joint fit-up and alignment, to include setting and checking all of the following, as applicable to the type of installation:
  - 4.1. handling and loading equipment
  - 4.2. traversing mechanisms
  - 4.3. safety mechanisms
  - 4.4. preparation of materials and joint faces to specification
  - 4.5. workholding arrangements
  - 4.6. transfer mechanisms
5. Set up the equipment to produce welded components, in the specified materials and forms that cover both of the following:
  - 5.1. two different material thicknesses
  - 5.2. two different joint configurations
6. Prove that the installation is operating correctly and is ready for production, by producing specified trial welds and checking all of the following, as applicable to the application:
  - 6.1. visual appearance of weld area
  - 6.2. dimensional accuracy
  - 6.3. weld quality
  - 6.4. machine settings are as specified
7. Solve problems in production relating to two of the following:
  - 7.1. machine performance
  - 7.2. condition of electrode
  - 7.3. joint set-up

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7.4. condition of materials being joined

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## Behaviours

### **Behaviours:**

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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