SEMFWE210

Welding materials using resistance spot, seam and projection welding machines

Overview

This standard identifies the competencies you need to operate resistance spot, seam or projection welding installations, which have already been prepared for production, in accordance with approved instructions or welding procedures. You will be expected to check that the installation has been approved for production, and that sufficient supplies of all 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 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 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 resistance 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 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.

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 and work instructions
3. confirm that the machine is set up and operating correctly, ready for the joining operations to be carried out
4. check that the parent material, components, consumables and joint preparation comply with specifications
5. operate and monitor the machine operations in accordance with specifications and job instructions
6. produce welded components in the specified materials and forms
7. achieve joints of the required quality and specified dimensional accuracy
8. make sure that the rate of output is as specified
9. deal promptly and effectively with problems within your control and report those that you cannot solve
10. shut down the equipment to a safe condition on conclusion of the joining activities

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken when operating resistance welding installations (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; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials)
2. the hazards associated with resistance welding machines (dangers from live internal electrical components, fumes, hot metal, expulsion of hot particles, moving parts of machines), and how they can be minimised
3. the basic principles of resistance welding; terminology used in welding
4. mechanised and automated welding basics (types of installation; machine functions; control systems; safety features)
5. the key components and features of the equipment used (power source; 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)
6. extracting the information required from drawings and welding procedure specifications (to include symbols and conventions to appropriate British, European or relevant International standards in relation to work undertaken)
7. operation of the machine controls and their function; clamping and transfer of components; equipment care procedures
8. setting up and aligning the workpiece
9. monitoring the installation during the welding process; recognition of problems, and action to be taken
10. 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. personal approval tests and their applicability to your work
14. the extent of your own authority and whom you should report to if you have problems that you cannot resolve
15. reporting lines and procedures, line supervision and technical experts

Scope/range related to performance criteria

1.

Confirm that the installation is ready for operation, 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 jigs and fixtures are in place and operate correctly
- 1.5 all machine functions operate correctly
- 1.6 all safety equipment is in place and functioning correctly

2.

Operate one of the following resistance welding installations:

- 2.1 spot welding
- 2.2 seam welding
- 2.3 projection welding

3.

Produce welded components in the specified materials and forms that cover both of the following:

- 3.1 two different material thicknesses
- 3.2 two different joint configurations

4.

Monitor the process operation, electrode condition and machine function and make adjustments to required parameters and mechanisms, to include all of the following as appropriate to the machine type:

- 4.1 welding current
- 4.2 welding and squeeze times
- 4.3 electrode pressure cycle
- 4.4 welding speed (seam)
- 4.5 weld pitch (spot)
- 4.6 mechanical functions

5.

Produce welded components which:

- 5.1 achieve a weld quality as specified in the application standard
- 5.2 spot and projection welds are correctly located
- 5.3 seam welds are of the correct dimensions
- 5.4 meet the required dimensional accuracy within specified tolerance

Behaviours

Additional Information

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

SEMFWE210

Welding materials using resistance spot, seam and projection welding machines

Developed by	Enginuity
Version Number	3
Date Approved	30 Mar 2017
Indicative Review Date	31 Mar 2020
Validity	Current
Status	Original
Originating Organisation	Semta
Original URN	SEMFWE210
Relevant Occupations	Engineering, Engineering and Manufacturing Technologies, Metal Forming, Welding and Related Trades
Suite	Fabrication and welding suite 2
Keywords	engineering; welding; fabrication; machine welding; resistance welding machine; spot welding; seam welding machine; projection welding machine; parameters