SEMFWE213

Welding materials using friction welding machines

Overview

This standard identifies the competencies you need to operate friction welding installations that 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 are 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, using the in-process monitoring features of the welding machine, 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 carry out.

Your underpinning knowledge will be sufficient to 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 friction 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. carry out and monitor the machine operations in accordance with specifications and job instructions
6. achieve joints of the required quality and specified dimensional accuracy
7. make sure that the rate of output is as specified
8. deal promptly and effectively with problems within your control and report those that you cannot solve
9. 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 safe working practices and procedures to be observed when operating friction 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 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)
2. the hazards associated with friction welding machines (dangers from live electrical components; fumes; hot metal; moving parts of machinery and components), and how they can be minimised
3. principles of friction welding; terminology used in welding
4. the key components and features of the equipment (types of machines; constructional features, mechanical features, drive train, driven and stationary component holding devices, force generation and control systems, braking systems; welding cycle control; feedback and recording)
5. mechanised and automated welding basics; types of installations; machine functions; safety features
6. extracting 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; care of equipment
8. setting up and aligning the workpiece
9. monitoring the installation during the welding process; the various types of monitoring features used on friction welding machines; 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; feedback from machine; corrective actions; 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 all machine functions operate correctly
1.5 all safety equipment is in place and functioning correctly

2.

Produce welded components covering both of the following:

2.1 two different components
2.2 two different material groups

3.

Monitor the process operation and machine functions and make adjustments as required to settings and mechanisms, to include all of the following, as appropriate to the machine type:

3.1 friction and forge cycle time
3.2 friction and forge loads (forces)
3.3 rotational speed or other friction conditions (such as orbital)
3.4 frictional burn-off characteristics and forge displacement
3.5 weld appearance (correct up-set)
3.6 braking effort

4.

Produce welded components which:

4.1 achieve a weld quality as specified in the application standard or specification
4.2 meet the required dimensional accuracy within specified tolerances

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

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