SEMMME3028

Setting metal spinning machines for production

Overview

This standard identifies the competences you need to prepare and set up metal spinning machines and metal spinning equipment, in accordance with approved procedures. This involves selecting the appropriate workholding devices, and mounting and positioning them to the machine in the correct location for the type of operation being carried out. You will also be expected to select the appropriate metal spinning tools and forming devices, check them for defects, and mount and secure them to the relevant tool holding device or forming device.

You will also be expected to set up and align the workpiece in the correct relationship to the machine spindle, and to set the machine operating parameters to produce the workpiece to the required specification. You must carry out trial forming, and prove the machine is working satisfactorily before declaring the installation 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 the machine setting activities undertaken, and to report any problems with the machine, forming device, tools, equipment or setting up activities that you cannot personally 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 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 the setting up procedures used. You will understand the metal spinning machine used, and its application, and will know about the workholding devices, forming tools, relevant materials, consumables and setting up procedures, in adequate depth to provide a sound basis 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 correct specifications for the component to be produced
3. determine what has to be done and how the machine will be set to achieve this
4. mount, set and secure the required workholding devices, workpiece and cutting tools
5. set the machine tool operating parameters to achieve the component specification
6. check that all safety mechanisms are in place and that the equipment is set correctly for the required operations
7. complete the required production documentation
8. deal promptly and effectively with problems within your control and report those that cannot be solved

Knowledge and understanding

You need to know and understand:

1. how to work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. the hazards associated with setting metal spinning machines and how to minimise them and reduce any risks
3. how to start and stop the machine in normal and emergency situations
4. the importance of ensuring that the machine is isolated from the power supply before mounting tools, workpieces and workholding devices
5. the importance of wearing the appropriate protective clothing (PPE) and equipment, and of keeping the work area clean and tidy
6. the basic principles of operation of the metal spinning machine, and typical operations that it can perform
7. how to handle and store forming tools and cutters safely and correctly
8. how to extract and use information from engineering drawings and related specifications (to include symbols and conventions to appropriate standards) in relation to work undertaken
9. how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
10. terminology used in metal spinning in relation to the activities undertaken
11. the range of workholding methods and devices that are used on metal spinning machines
12. the methods of mounting and setting the workpiece on the workholding device, and the tools and equipment that can be used
13. the different types of metal spinning tools and cutters that are used, and how they are selected, prepared and mounted to the machine tool holding devices
14. factors which determine speeds to be used
15. how the various types of materials will affect the speeds and forming pressures that can be used
16. how to set up the machine for the particular operations being performed
17. the need to conduct trial runs, and to check that the machine is set up and running safely and correctly
18. problems that can occur with setting up the metal spinning tools and cutters, workholding devices and machine operating parameters, and what to do if

problems occur

19. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve

Scope/range related to performance criteria

1. Carry out all of the following activities during setting up:
    1.1 obtain and use the appropriate documentation
    1.2 adhere to procedures or systems in place for risk assessment, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
    1.3 follow safe practice/approved setting up procedures at all times
    1.4 ensure that correctly adjusted machine guards are in place
    1.5 check that the metal spinning tools and cutters are in a safe and usable condition
    1.6 hold components securely without distortion
    1.7 leave the work area and machine in a safe and appropriate condition on completion of the activities
2. Prepare one of the following metal spinning machines in readiness for production:
    2.1 hand spinning
    2.2 special purpose spinning
    2.3 power spinning
3. Select forming device or method, to include four of the following:
    3.1 plain formers
    3.2 split formers
    3.3 tailstock-mounted back plates
    3.4 segmental formers
    3.5 top slide-mounted rollers
    3.6 pre-forms
    3.7 on-air
4. Select and mount metal spinning tools and cutters, to include four of the following:
    4.1 finishing rollers
    4.2 burnishing tools/skimmers
    4.3 handheld metal/wooden spinning tools
    4.4 rough forming rollers
    4.5 trimming/cutting tools
    4.6 power spinning tools and cutters
5. Set up the machine in accordance with instructions and specifications, to include setting all of the following:
    5.1 forming template/jig
    5.2 forming tools in tool holding devices
    5.3 feed rates (where appropriate)
    5.4 workpiece
    5.5 machine guards/safety mechanisms
    5.6 spindle speeds

5.7 forming tool work rests

6. Set up the machine to rough and finish internal and external forms, that must include ten of the following:
   - 6.1 convex shapes
   - 6.2 bulging/necking
   - 6.3 lipping
   - 6.4 re-entrant
   - 6.5 concave shapes
   - 6.6 flanges
   - 6.7 hemispheres
   - 6.8 trimming
   - 6.9 cones
   - 6.10 cylinders
   - 6.11 joints and joining
   - 6.12 double seaming
   - 6.13 beading
7. Make components from one of the following types of material:
   - 7.1 ferrous
   - 7.2 non-ferrous
8. Set the machine to produce components within all of the following quality and accuracy standards, as applicable to the operations performed:
   - 8.1 dimensional tolerance equivalent to relevant standards
   - 8.2 surface finish 63µin or 1.6µm
   - 8.3 angles/tapers within +/- 0.5 degree
   - 8.4 shape and form comply with template and/or specification requirements
   - 8.5 components to be free from ripples, deformity, burrs and sharp edges

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