

Producing components using metal spinning machines

Overview

This standard identifies the competences you need to carry out metal spinning operations, in accordance with approved procedures, using metal spinning machines and associated metal spinning attachments. You will be required to check that the machine is ready for the operations to be performed, and that all the required components or materials and consumables are available. You will be expected to produce a range of components that combine a number of different features, such as roughing and finishing forms, producing concave and convex profiles, cones, cylinders, hemispheres, re-entrant, bulging/necking, lipping, beading, flanging, joins and jointing, double seaming and trimming operations.

You will be required to operate the machine in line with safe working practices and approved procedures, and to continuously monitor the spinning operations, making any necessary adjustments, in order to ensure that the work output is to the required quality and accuracy. Meeting production targets 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 the spinning activities undertaken, and to report any problems with the spinning activities, equipment or forming tools 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 actions and for the quality and accuracy of the work that you produce.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to applying metal spinning procedures. You will understand the metal spinning process, and its application, and will know about the equipment, materials and consumables, 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.

Setting up of the machine, its tooling and associated workholding devices, is the subject of another standard.

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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. confirm that the machine is set up and ready for the machining activities to be carried out
3. manipulate the machine tool controls safely and correctly in line with operational procedures
4. produce components to the required quality and within the specified dimensional accuracy
5. carry out quality sampling checks at suitable intervals
6. deal promptly and effectively with problems within your control and report those that cannot be solved
7. complete the required production documentation
8. shut down the equipment to a safe condition on conclusion of the machining activities

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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 safety mechanisms on the machine, and the procedure for checking that they function correctly
3. operation of the machine controls in both hand and power modes, and how to stop the machine in an emergency
4. the personal protective equipment (PPE) to be worn, and where this can be obtained
5. the hazards associated with carrying out the metal spinning operations, and how to minimise them and reduce any risks
6. the importance of keeping the work area clean and tidy
7. where to obtain the component drawings, specifications and/or job instructions required for the components to be machined
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. the application of a range of metal spinning machines and metal spinning attachments
11. the various metal spinning techniques that can be used to produce the required shapes, and the types of metal spinning formers, cutters and tools required
12. the methods that can be used to position the workpiece in relation to the metal spinning former, cutters and tools
13. how to handle and store formers and cutting tools, safely and correctly
14. factors which affect the selection of speeds required, and the pressure that can be put on to the workpiece
15. how the various types of materials will affect the speeds that can be used
16. the application of roughing and finishing forms, and the effect on former and tool life, surface finish and dimensional accuracy
17. the effects of clamping the workpiece, and how this can cause distortion in the finished components
18. the effects of displacing material, how this can cause warping/distortion of the workpiece, and how this can be overcome
19. how to recognise spinning faults and identify when forming tools need dressing or sharpening
20. the quality control procedures used, inspection checks to be carried out, and the equipment to be used

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21. the problems that can occur with the metal spinning activities, and how these can be overcome
22. the extent of your own authority and to whom you should report if you have problems that you cannot resolve

Scope/range related to performance criteria

1. Ensure that you apply all of the following during the spinning activities:
 - obtain and use the appropriate documentation
 - 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
 - ensure that machine guards are in place and correctly adjusted
 - hold components securely without distortion
 - maintain forming and cutting tools in a safe and usable condition
 - apply safe working practices at all times
 - adjust machine settings, as required, to maintain the required accuracy
 - ensure that components produced meet specification
 - leave the work area and machine in a safe and appropriate condition on completion of the activities
2. Produce components which combine different operations and which cover ten of the following:
 - convex shapes
 - lipping
 - concave shapes
 - hemispheres
 - bulging/necking
 - re-entrant
 - flanges
 - trimming
 - cones
 - double seaming
 - cylinders
 - beading
 - joints and joining
3. Make components from one of the following types of material:
 - ferrous
 - non-ferrous
4. Carry out the quality sampling checks during production for accuracy of five of the following:
 - external diameters
 - angles
 - internal diameters
 - profiles

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- lengths
 - surface finish
 - depths
5. Produce components within all of the relevant quality and accuracy standards, as applicable to the operations performed:
- dimensional tolerance equivalent to relevant standards
 - surface finish 63µin or 1.6µm
 - angles/tapers within +/- 0.5 degree
 - shape and form comply with template and/or specification requirements
 - components to be free from ripples, deformity, burrs and sharp edges

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