

Overview

This standard identifies the competences you need to carry out turning operations on a turret lathe, in accordance with approved procedures. You will be required to check that the machine is ready for the operations to be performed and that all the required components/materials and consumables are available. You will be expected to produce a range of components that combine a number of different features, such as parallel, stepped and tapered diameters, drilled, bored and reamed holes, internal and external threads, and special forms/profiles.

You will be required to operate the machine in line with safe working practices and approved procedures, and to continuously monitor the machining 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 machining activities undertaken, and to report any problems with the machining activities 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 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 machining procedures. You will understand the turret lathe turning 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.

This standard does not cover CNC applications, for which other standards apply.

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

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

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, including rapid power of the turret head
4. how to stop the machine in both normal and emergency situations, and the procedure for restarting after an emergency
5. the personal protective equipment to be worn, and where this can be obtained
6. the hazards associated with carrying out the turning operations, and how to minimise them and reduce any risks
7. the importance of keeping the work area clean and tidy
8. where to obtain the component drawings, specifications and/or job instructions required for the components to be machined
9. 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
10. how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
11. the main features of the turret lathe and the accessories that can be used
12. the various turning operations that can be performed, and the shapes and types of tooling that can be used
13. the methods that can be used to position the tooling in relationship to the workpiece
14. the effects of backlash in machine slides and screws, and how this can be overcome
15. how to handle and store tools safely and correctly
16. factors which affect the selection of cutting feeds and speeds, and the depth of cut that can be taken
17. how the various types of material will affect the feeds and speeds that can be used
18. the application of roughing and finishing cuts, and the effect on tool life, surface

finish and dimensional accuracy

19. the application of cutting fluids with regard to a range of different materials
20. the effects of clamping the workpiece in a chuck/work holding device, and how this can cause distortion in the finished components
21. how to recognise machining faults and identify when tools need re-sharpening
22. the quality control procedures used, inspection checks to be carried out, and the equipment to be used
23. the problems that can occur with the turning activities, and how these can be overcome
24. 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 machining 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 cutting tools in a suitable 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 machined components which combine different operations and cover ten of the following:
 - flat faces
 - drilled holes
 - internal threads
 - chamfers
 - parallel diameters
 - bored holes
 - external threads
 - knurls/special finishes
 - stepped diameters

Machining components using turret lathes

- reamed holes
 - eccentric features
 - grooves/undercuts
 - tapered diameters
 - profile forms
 - parting off
3. Machine components made from one of the following types of material:
- ferrous
 - non-ferrous
 - non-metallic
4. Carry out the necessary checks during production for accuracy of five of the following:
- diameters
 - lengths/depths
 - hole size/fit
 - thread profile and fit
 - angle/taper
 - concentricity
 - surface finish
 - slot/recess width
5. Produce components within all of the following quality and accuracy standards applicable to the operations performed:
- components to be free from false tool cuts, burrs and sharp edges
 - dimensional tolerance equivalent to relevant standards

Machining components using turret lathes

- surface finish 63µin or 1.6µm
- reamed and bored holes within H8
- screw threads BS medium fit
- angles within +/- 0.5 degree

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