

Operating shaping, planing or slotting machines

Overview

This standard identifies the competences you need to carry out machining operations on a shaping, planing or slotting machine, in accordance with approved procedures. You will confirm with the machine setter 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 cover a number of different features, such as parallel faces, flat faces, faces that are square to each other, angular faces, steps, slots, keyways, flat sided holes, splines and serrations, as applicable to the machine used.

You will be required to operate the machine in line with safe working practices and approved procedures, to continuously monitor the machining operations and, where necessary, make minor adjustments or seek the help of the setter to make the required 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 personally 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 actions and for the quality and accuracy of the work that you produce.

Your underpinning knowledge will be sufficient to provide a sound basis for your work, and will enable you to adopt an informed approach to applying shaping, planing or slotting procedures. You will have an understanding of the shaping, planing, or slotting process and its application, and will know about the equipment, materials and consumables in adequate depth to provide a sound background for carrying out the activities to the required specification.

You will understand the safety precautions required when working with the machine, 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 and is the responsibility of the machine-tool setter.

Operating shaping, planing or slotting machines

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. operate 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

Operating shaping, planing or slotting machines

Knowledge and understanding

You need to know and understand:

1. the safe working practices and procedures to be followed whilst operating shaping, planing or slotting machines
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, where appropriate)
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 (PPE) to be worn, and where this can be obtained
6. the hazards associated with operating shaping, planing or slotting machines and with the operations carried out, 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 BS, ISO or BSEN standards) in relation to work undertaken
10. how to use imperial and metric systems of measurement
11. the main features of the shaping, planing or slotting machine used, and the accessories that can be used
12. the various operations that can be performed on the machine, and the methods and equipment used
13. the effects of backlash in machine slides and screws, and how this can be overcome
14. how to handle and store tools safely and correctly
15. the application of roughing and finishing cuts, and the effect on tool life, surface finish and dimensional accuracy
16. the application of cutting fluids with regard to a range of different materials
17. the effects of clamping the work piece in a chuck/work holding device, and how this can cause distortion in the finished components
18. how to recognise machining faults, and how to identify when tools need re-sharpening.
19. the quality control procedures used, inspection checks to be carried out, and the equipment that will need to be used
20. the problems that can occur with the machining activities, and how these can be overcome
21. the extent of your own authority and to whom you should report if you have problems that you cannot resolve

Operating shaping, planing or slotting machines

Scope/range related to performance criteria

1. Apply **all** of the following during the machining activities:

1. obtain and use the appropriate documentation (such as job instructions, drawings, quality control documentation)
2. adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
3. confirm with the machine setter that the machine is ready for production
4. where appropriate, seek any necessary instruction/training on the operation of the machine
5. ensure that machine guards are in place and are correctly adjusted
6. hold components securely, without distortion
7. follow the defined operating procedures and apply safe working practices and procedures at all times
8. ensure that machine settings are adjusted as and when required (either by yourself or the setter) to maintain the required accuracy
9. ensure that the components produced meet the required specification for quality and accuracy
10. leave the work area and machine in a safe and appropriate condition on completion of the activities

2. Operate **one** type of machine from the following:

1. shaping
2. planing
3. slotting
4. milling machine with slotting attachment

3. Produce machined components which combine different operations and cover **four** of the following:

1. flat faces
2. angular faces
3. flat sided holes (such as square, hexagonal)
4. faces that are square to each other
5. slots/grooves
6. parallel faces
7. special forms
8. splines
9. steps/shoulders

Operating shaping, planing or slotting machines

10. keyways
 11. serrations
4. Machine components made from **one** type of material from the following:
 1. ferrous
 2. non-ferrous
 3. non-metallic
 5. Use appropriate gauges or instruments to carry out the necessary checks, during production, for accuracy of **three** of the following:
 1. dimensions
 2. spline or serration fit
 3. squareness
 4. surface finish
 5. angles
 6. slot or recess width and position
 7. flatness
 8. keyway position
 6. Produce components with dimensional accuracy, form and surface within **all** the relevant quality and accuracy standards as is applicable to the operations performed:
 1. components to be free from false tool cuts, burrs and sharp edges
 2. dimensional tolerance equivalent to BS EN 20286 or BS 1916 Grade 9
 3. flatness and squareness within 0.005" per inch or 0.125mm per 25mm
 4. surface finish 63 μin or 1.6 μm
 5. angles within +/- 1 degree

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