SEMPEO2-23 (SQA Unit Code - FP2Y 04)
Producing platework components and assemblies

Overview

This standard covers a broad range of basic heavy platework (above 3 mm) competences that will prepare you for entry into the engineering or manufacturing sectors, creating a progression between education and employment, or that will provide a basis for the development of additional skills and occupational competences in the working environment.

You will be expected to prepare for the plateworking activities by obtaining all necessary information, documentation, tools and equipment required, and to plan how you intend to carry out the required cutting, forming and assembly activities, and the sequence of operations you intend to use.

You will be required to select the appropriate equipment to use, based on the type and thickness of material, the operations to be carried out and the accuracy to be achieved. In carrying out the cutting and shaping activities, you will need to use a range of hand tools, portable power tools and machines to produce a variety of shapes, profiles and forms. You will also be expected to produce simple platework assemblies, using mechanical fastening devices and tack welding.

Your responsibilities will require you to comply with health and safety requirements and organisational policy and procedures for the plate working activities undertaken. You will need to take account of any potential difficulties or problems that may arise with the activities, and to seek appropriate help and advice in determining and implementing a suitable solution. You will work under a high level of supervision, whilst taking responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide an understanding of your work, and will enable you to apply appropriate plateworking techniques and procedures safely. You will understand the cutting, forming and assembly process, and its application, and will know about the tools and equipment used, to the required depth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety precautions required when carrying out plateworking the activities, and when using the various tools and equipment, especially those involved in using guillotines and bending/forming 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.

Specific Standard Requirements

SEMPEO2-23 (SQA Unit Code - FP2Y 04)
Producing platework components and assemblies

In order to prove your ability to combine different platework cutting and forming operations, at least one of the assemblies produced must be of a significant nature, and must contain components with a minimum of **three** of the features listed in scope 6 plus **three** of the features listed in scope 8.

SEMPEO2-23 (SQA Unit Code - FP2Y 04)
Producing platework components and assemblies

Performance criteria

You must be able to:

- P1 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
- P2 plan the plateworking activities before you start them
- P3 obtain the appropriate tools and equipment for the plateworking operations, and check that they are in a safe and usable condition
- P4 mark out the components for the required operations, using appropriate tools and techniques
- P5 cut and shape the materials to the required specification, using appropriate tools and techniques
- P6 use the appropriate methods and techniques to assemble and secure the components in their correct positions
- P7 measure and check that all dimensional and geometrical aspects of the components are to the specification
- P8 deal promptly and effectively with problems within your control, and seek help and guidance from the relevant people if you have problems that you cannot resolve
- P9 leave the work area in a safe and tidy condition on completion of the platework activities

SEMPEO2-23 (SQA Unit Code - FP2Y 04)
Producing platework components and assemblies

Knowledge and understanding

You need to know and understand:

K1 the health and safety requirements, and safe working practices and procedures required for the plateworking activities undertaken

K2 the personal protective clothing and equipment (PPE)to be worn when carrying out the plateworking activities (such as leather gloves, eye protection, ear protection), and the importance of keeping the work area safe and tidy

K3 the correct methods of moving or lifting long and heavy sheet and section materials

K4 the hazards associated with carrying out heavy plateworking activities (such as handling sheet materials, using dangerous or badly maintained tools and equipment, operating guillotines, cropping and bending machines, and when using power saws, drilling machines and abrasive cutting discs), and how they can be minimised

K5 the procedure for obtaining the required drawings, job instructions and other related specifications

K6 how to use and extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS or ISO standards) in relation to work undertaken

K7 how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing

K8 how to prepare the materials in readiness for the marking out activities, in order to enhance clarity, accuracy and safety (such as visually checking for defects, cleaning the materials, removing burrs and sharp edges, applying a marking out medium)

K9 how to select and establish a suitable datum; the importance of ensuring that marking out is undertaken from the selected datum, and the possible effects of working from a different datum

K10 use of marking out conventions when marking out the workpiece (including datum lines, cutting guidelines, square and rectangular profiles, circular and radial profiles, angles, holes linearly positioned, boxed and on pitch circles)

K11 ways of laying out the marking-out shapes or patterns to maximise use of materials

K12 the tools and techniques available for cutting and shaping heavy plate and section materials (such as guillotines, cropping machines, abrasive discs (such as hand held portable machines and bench type radiac cutting machines), drilling machines and machine saws)

K13 the selection and fitting of abrasive cutting discs, cutting disc identification markings, how to identify the correct type of disc for the type of material being cut; statutory regulations regarding the fitting and

use of abrasive discs

K14 the use and care of tools and equipment (including checks that must be made to ensure that the tools are fit for purpose - such as cutting blades are sharp and undamaged, setting and adjusting guillotine blades for the material thickness, ensuring machine guards, interlocks or other safety devices are operating correctly)

K15 the various shearing machine cutting methods and techniques (such as cutting to marking out; using machine back-stops; setting plate at an angle to the machine slides)

K16 the various machine tool forming equipment that can be used to produce a range of shapes (such as bends, box sections, cylinders and curved sections)

K17 how to set up the various machines to produce the required forms (setting up of rolls; releasing formed work from rolls; setting up bending machines and setting forming tools)

K18 ways of limiting distortion, marking, creases, flats (in curved sections)

K19 the characteristics of the various materials used (with regard to the bending and forming process); how the materials are to be prepared for the forming operations, and why some materials may require a heating process prior to forming

K20 the various methods of securing the assembled components; the range of mechanical fastening devices that are used (such as nuts and bolts, rivets, screws, special fasteners); tack welding methods and techniques

K21 the preparations to be carried out on the components prior to assembling them

K22 how to set up and align the various components, and the tools and equipment that are used for this

K23 methods of temporarily holding the joints together to aid the assembly activities

K24 inspection techniques that can be applied to check that shape (including straightness) and dimensional accuracy are to specification and within acceptable limits

K25 the problems that can occur with the heavy plateworking activities, and how these can be overcome (such as defects caused by incorrectly set or blunt shearing blades)

K26 when to act on your own initiative and when to seek help and advice from others

K27 the importance of leaving the work area and equipment in a safe and clean condition on completion of the platework activities (such as removing and storing power leads, isolating machines, cleaning the equipment, and removing and disposing of waste)

SEMPEO2-23 (SQA Unit Code - FP2Y 04)
Producing platework components and assemblies

Additional Information

Scope/range related to performance criteria

You must be able to:

1. Carry out **all** of the following during the plateworking activities:
   - 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE)and other relevant safety regulations
   - 1.2 ensure that all power tool cables, extension leads or air supply hoses are in a tested and serviceable condition
   - 1.3 return all tools and equipment to the correct location on completion of the plateworking activities
   - 1.4 check that all measuring equipment is within calibration date

2. Use marking out methods and techniques, including:
   - 2.1 direct marking using instruments

   Plus **one** more from the following:
   - 2.2 use of templates
   - 2.3 tracing/transfer methods
   - 2.4 other specific method

3. Use a range of marking out equipment, to include **all** of the following:
   - 3.1 scriber
   - 3.2 rule or tape
   - 3.3 square
   - 3.4 dividers or trammels
   - 3.5 punch
   - 3.6 straight edge
   - 3.7 protractor
   - 3.8 chalk, blueing or paint

4. Mark out material, to include **all** of the following features:
   - 4.1 datum and centre lines
   - 4.2 curved profiles
   - 4.3 square/rectangular profiles
   - 4.4 cutting and bending detail (including allowances)
   - 4.5 angles
   - 4.6 hole centring and outlining (such as circular or linear)
   - 4.7 circles

5. Cut and finish material to the marked out shape, using **both** of the

following:

5.1 guillotine
5.2 drill (such as bench, pillar, radial)

Plus **two** more from the following:

5.3 abrasive disc
5.4 cropping machine
5.5 machine saw

6. Perform cutting operations to produce components that combine operations and cover **all** of the following features:

6.1 components with parallel sides
6.2 components with sides square to each other
6.3 holes linearly pitched

Plus **two** more from the following:

6.4 components with angled sides
6.5 components with curved contours
6.6 holes radially pitched
6.7 bevelled edges or weld preps

7. Use **two** of the following types of forming equipment/techniques:

7.1 bending machine (hand or powered)
7.2 presses
7.3 rolling machine (hand or powered)
7.4 heating techniques

8. Perform forming operations to produce components that combine operations and cover **all** of the following features:

8.1 bends at 90°
8.2 bends of various angles
8.3 cylinders

Plus **two** more of the following:

8.4 set plate ends
8.5 segments of a cylindrical tank
8.6 box square and rectangular sections
8.7 curved section or sector of an otherwise flat plate
8.8 curved plates
8.9 counter-curved sections
8.10 pipe sections
8.11 flattening or straightening plate
8.12 cones

9. Assemble platework components using **two** of the following methods:

9.1 temporary tack welding
9.2 adhesive bonding
9.3 riveting (hot or cold)
9.4 mechanically fastened (such as bolts, screws)

10. Use the following materials:
    - 10.1 flat plate

    Plus **one** more from the following:
    - 10.2 pipe/tube
    - 10.3 rolled sections (angle, channel, RSJ, rail section)
    - 10.4 solid bar (such as square, round, hexagonal)
    - 10.5 non-ferrous materials

11. Produce platework components which meet **all** of the following:
    - 11.1 all dimensions are within +/- 3.0mm or +/- 0.125”
    - 11.2 finished components meet the required shape/geometry (such as square, straight, angles free from twists)
    - 11.3 completed components are free from excessive tooling marks, deformation, cracking, sharp edges, slivers or burrs
    - 11.4 all components are correctly assembled, and have secure and firm joints

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