

Overview

This standard identifies the competencies you need for cutting and shaping metal plate and sections (3 mm thickness and above) for fabrications using guillotines and section cropping machines, in accordance with approved procedures. You will be required to select the appropriate equipment and machine settings to use for the material and thickness and the accuracy required to be achieved. Materials to be cut and shaped may include ferrous and non-ferrous and will include parallel cuts, square cuts, and cuts that are at an angle. These cuts will be achieved by working to marking out and by setting the machines back stop when multiple cutting is required. This will call for care in selecting the right tools so as to avoid damage to the materials and tools, and danger to oneself.

Your responsibilities will require you to comply with organisational policy and procedures, seeking out relevant information for the activities undertaken and to report any problems with the equipment, materials or cutting activities that you cannot personally resolve or are outside your permitted authority to the relevant people. You will be expected to work with minimum supervision taking personal responsibility for your own actions and the quality and accuracy of the work that you produce.

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

SEMFWE3-32 SQA Unit Code H1W7 04

Cutting plate and sections using shearing machines

Performance criteria

- You must be able to:*
- P1 work safely at all times, complying with health and safety and other relevant regulations and guidelines
 - P2 confirm that the machine is set up and ready for the machining activities to be carried out
 - P3 manipulate the machine tool controls safely and correctly in line with operational procedures
 - P4 produce components to the required quality and within the specified dimensional accuracy
 - P5 carry out quality sampling checks at suitable intervals
 - P6 deal promptly and effectively with problems within your control and report those that cannot be solved
 - P7 shut down the equipment to a safe condition on conclusion of the machining activities

SEMFWE3-32 SQA Unit Code H1W7 04

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Knowledge and understanding

You need to know and understand:

- K1 the specific safety precautions to be taken when working in a fabrication environment and when working with shearing machines (general workshop and site safety, appropriate personal protective equipment (PPE), accident procedure; statutory regulations, risk assessment procedures and COSHH regulations)
- K2 the personal protective clothing and equipment that needs to be worn when carrying out the fabrication activities (such as leather gloves, eye/ear protection, safety helmets)
- K3 safe working practices and procedures for operating machine tools
- K4 the correct methods of moving or lifting heavy plate and the equipment to be used
- K5 the hazards associated with fabrication work and shearing operations and how they can be minimised (such as using dangerous or badly maintained tools and equipment; lifting and handling plate; operating machinery)
- K6 how to obtain the necessary drawings and specifications
- K7 how to use and extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate British, European or relevant International standards in relation to work undertaken)
- K8 how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
- K9 how to interpret marking out conventions (such as cutting lines, centre lines)
- K10 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)
- K11 material handling and preparation methods (such as degreasing, de-burring, straightening)
- K12 the material cutting characteristics and process considerations that need to be taken into account when shearing plate material
- K13 the method of setting and adjusting guillotine blades for the material thickness
- K14 tool and equipment care and control procedures and how to recognise when the cutting blades require changing
- K15 the importance of using tools or equipment only for the purpose intended; the care that is required when using the tools or equipment; the proper way of preserving tools or equipment between operations
- K16 the safety mechanisms and devices that are on the machine and why they must always be used (machine guards, interlocks, safety operating

SEMFWE3-32 SQA Unit Code H1W7 04

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devices

- K17 the problems that can occur when shearing materials and how these can be avoided
- K18 inspection techniques that can be applied to check shape and dimensional accuracy are to specification and within acceptable limits
- K19 the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve
- K20 reporting lines and procedures, line supervision and technical experts

SEMFWE3-32 SQA Unit Code H1W7 04

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Additional Information

Scope/range related to performance criteria

You must be able to:

1. confirm that the equipment is safe and fit for purpose by carrying out **all** of the following checks:
 - 1.1 the appropriate equipment/machine is selected for the operation being performed
 - 1.2 the machine guards and safety devices are in position and function correctly
 - 1.3 cutting blades are in a serviceable condition (sharp, free from damage or chips)
 - 1.4 machine settings are suitable for the material thickness and operations to be performed
2. cut metal plate using **both** of the following types of shearing machine:
 - 2.1 guillotines
 - 2.2 section cropping machine
3. cut materials using **both** of the following techniques:
 - 3.1 to markings
 - 3.2 using machine back-stop for multiple cutting
4. perform operations that produce straight and accurate cuts which includes **all** of the following:
 - 4.1 parallel cuts
 - 4.2 square cuts
 - 4.3 angular cuts
5. cut plate, sections or bars for **one** appropriate material and for two different thicknesses:
 - 5.1 mild steel
 - 5.2 brass or copper
 - 5.3 stainless steel
 - 5.4 tin plate
 - 5.5 aluminium
 - 5.6 other specific materials
6. produce cut components which meet **all** of the following quality and accuracy standards:
 - 6.1 dimensional accuracy is within the tolerances specified on the drawing/specification
 - 6.2 cut components are free from excessive distortion
 - 6.3 cut edges are neat and free from false tool cuts and shearing slivers
 - 6.4 angled cuts are within specification requirements

SEMFWE3-32 SQA Unit Code H1W7 04
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