
Overview

This standard identifies the competences you need to cut and shape material, in order to fabricate clips, brackets, covers, trunking and similar components (including templates), in accordance with approved procedures. You will be required to select the appropriate equipment to use for the material, thickness and accuracy required and you will be expected to use hand tools, hand power tools and machinery, as applicable. The cutting and shaping will involve producing straight cuts, curved contours, cut-ins, notches and circular holes.

Materials to be cut and shaped may include ferrous and non-ferrous. This will call for care in selecting the right tools, so as to avoid damage to the tools and danger to oneself.

Your responsibilities will require you to comply with organisational policy and procedures, to seek out relevant information and to report any problems with the cutting activities, equipment or materials that you cannot personally resolve, or are outside your permitted authority, to the relevant person. You will be expected to work with a minimum of supervision, taking personal responsibility for your own 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 sheet metal cutting and shaping procedures. You will understand the processes, the equipment and its application and will know about the materials, 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 fabrication tools and machinery. You will be required to demonstrate safe working practices throughout and will understand the responsibility you owe to yourself and others in the workplace.

**Performance
criteria**

You must be able to:

- P1 work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
- P2 follow relevant specifications for the component to be produced
- P3 obtain the appropriate tools and equipment for the shaping operations and check they are in a safe, tested and usable condition
- P4 shape the materials using appropriate methods and techniques
- P5 check that all the required shaping operations have been completed to the required specification
- P6 deal promptly and effectively with problems within your control and report those that cannot be solved

Knowledge and understanding

You need to know and understand:

- K1 the specific safety precautions to be taken when working in a marine fabrication environment and when working with power operated saws and abrasive disc cutting machines, both on land and on board vessels (including general workshop and site safety, statutory regulations, accident procedure, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations)
- K2 the personal protective clothing and equipment (PPE) to be worn when carrying out the fabrication activities (such as leather gloves, eye/ear protection and safety helmets)
- K3 the correct methods of moving or lifting heavy plate, bar and rolled sections
- K4 safe working practices and procedures to be observed when using manual and power operated tools (including emergency shutdown procedures)
- K5 the hazards associated with marine fabrication work (such as using dangerous or badly maintained tools and equipment, operating guillotines, using hand and bench shears, airborne particles, hot metal, burrs and sharp edges) and how they can be minimised
- K6 the procedures for obtaining the necessary drawings and specifications, and how to check that they are the latest issue
- K7 how to extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS or ISO standards) in relation to the 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 the marking out conventions on the materials to be cut and shaped (such as cutting lines, centre lines)
- K10 the range of machine saws available (such as power hacksaws, circular saws and band saws)
- K11 the abrasive cutting equipment available (to include hand-held portable machines and bench type radiac cutting machines)
- K12 the selection and fitting of abrasive cutting discs; cutting disc identification markings and how to identify the correct type of disc of the type of material being cut
- K13 statutory regulations regarding the fitting and use of abrasive discs
- K14 the material cutting characteristics and process considerations to be taken into account when cutting materials
- K15 the preparations that you may have to carry out on the material prior to cutting it
- K16 the use and care of tools and equipment, including checks to be made to ensure that the tools are fit for purpose (such as sharp, plugs and cables)

- secure, tested and free from damage, machine guards or safety devices operating correctly)
- K17 setting and adjusting tools and equipment (such as the use of backstops on guillotines)
- K18 the use of safety screens to protect other users from flying sparks whilst using abrasive cutting discs
- K19 the importance of ensuring that the machine guards are correctly fitted and positioned before using the equipment
- K20 how to set and adjust power saws for the various operations being performed
- K21 the importance of using tools or equipment only for the purpose intended
- K22 the care that is required when using the tools or equipment and the proper way of preserving tools or equipment between operations
- K23 the calibration/care and control procedures for tools and equipment
- K24 the problems that can occur when cutting materials using saws or abrasive discs and how these can be avoided
- K25 inspection techniques that can be applied to check that shape and dimensional accuracy are to specification and within acceptable limits
- K26 the procedure for the safe disposal of waste materials
- K27 the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve

Additional Information

Scope/range related to performance criteria

You must be able to:

1. Carry out **all** of the following during the cutting and shaping activities:
 - 1.1. select the appropriate hand tool or machine for the operation being performed
 - 1.2. check that machine guards and safety devices are in position and function correctly
 - 1.3. check that cutting discs/blades are in a serviceable condition (free from damage or chips and are sharp)
 - 1.4. isolate the equipment from its power supply whilst changing blades and discs
 - 1.5. use the equipment safely and correctly and only for its intended purpose

2. Cut and finish material to the marked-out shape, using **six** of the following tools and equipment:
 - 2.1. bench shears
 - 2.2. guillotine
 - 2.3. hacksaw
 - 2.4. band saw
 - 2.5. portable drill
 - 2.6. pillar drill
 - 2.7. files
 - 2.8. abrasive disc cutting machines
 - 2.9. punch/cropping machine
 - 2.10. trepanning
 - 2.11. nibbling machine

3. Cut and shape **three** of the following forms of material:
 - 3.1. flat plate
 - 3.2. pipe and tube
 - 3.3. rolled sections/bar (such as angle, RSJ, tee bar, bulb bar)
 - 3.4. solid bar (such as square, round)
 - 3.5. rail section
 - 3.6. non-ferrous material

4. Perform operations to produce **four** of the following shapes:
 - 4.1. straight cuts
 - 4.2. angled/mitre cuts
 - 4.3. irregular shapes

- 4.4. curved contours
 - 4.5. notches
 - 4.6. circular holes
 - 4.7. chamfers
5. Produce cut and shaped components which meet **all** of the following standards:
- 5.1. dimensional accuracy is within specification tolerance
 - 5.2. angled cuts are within specification requirements
 - 5.3. cuts are clean and free from excessive burrs or slivers
 - 5.4. components are free from distortion

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Cutting materials using hand and machine tools

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