SEMME3240

Producing marine outfitting components in sheet metal

Overview

This standard identifies the competences you need to cut, shape and form marine outfitting components in sheet metal (up to and including 3 mm) using hand tools and machine tools, in accordance with approved procedures. You will be required to select the appropriate equipment to use, based on the operations required, the material to be cut, shaped and formed and the accuracy to be achieved and this will include using such equipment as hand snips, bench shears, guillotines, drilling machines, hammers and stakes, formers, bending machines, rolling machines, wiring and swaging machines.

The components produced will be used for marine outfitting applications such tanks, ducting and trunking, guards, hoods, stowage racks, shower and toilet cubicles, galley equipment, kit lockers, pyrotechnic lockers, protective covers and cladding.

Materials to be cut, shaped and formed 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 for the sheet metal cutting, shaping and forming activities undertaken and to report any problems with the cutting, shaping and forming activities, equipment or materials that you cannot personally resolve, or that 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 carry out.

Your underpinning knowledge will provide a good understanding of your work and will provide an informed approach to applying sheet metal cutting, shaping and forming procedures to marine outfitting components. You will understand the cutting, shaping and forming equipment used and its application and will know about the materials and their characteristics 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 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:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. follow instructions and any relevant specifications to produce the component
3. produce the required components using appropriate manufacturing methods and techniques
4. check that the finished component meets the requirements and make any necessary adjustments
5. deal promptly and effectively with problems within your control and report those that cannot be solved
6. complete relevant documentation in line with organisational procedures

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken when working with sheet metal equipment and materials in a marine fabrication environment (including general workshop and site safety, appropriate personal protective equipment (PPE), accident procedure; statutory regulations, risk assessment procedures and COSHH regulations, safe disposal of waste materials)
2. the personal protective clothing and equipment (PPE) to be worn when carrying out the marine fabrication activities (such as leather gloves, eye/ear protection, safety helmets
3. the correct methods of moving or lifting sheet or plate materials
4. safe working practices and procedures to be observed when using manual and power operated tools
5. the hazards associated with marine fabrication work (such as using dangerous or badly maintained tools and equipment, using hand and bench shears, operating guillotines and power operated forming equipment) and how they can be minimised
6. the procedures for obtaining the necessary drawings, specifications and work instructions and how to check that they are the latest issue
7. how to extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS or ISO standards), in relation to work undertaken
8. how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
9. how to interpret the marking-out conventions on the materials to be cut and shaped (such as cutting lines, centre lines, hole positions, bending and folding lines)
10. the tools and techniques available for cutting and shaping sheet metal (such as tin snips, bench shears, guillotines, portable power tools, bench drills, saws)
11. hand tools used in sheet metal forming activities and typical operations that they are used for (such as range of hammers, stakes, formers, sand bags)
12. the types of machine tool forming equipment that can be used to produce a range of shapes (such as bends, box sections, cylinders and curved sections, wired edges and swages)

13. how to set up the various machines to produce the required forms (such as setting up of rolls; setting fingers on bending machines; setting forming tools for swaging; setting backstops on guillotines)
14. how the materials are to be prepared for the cutting, shaping and forming operations and why some materials may require a heating process prior to forming
15. the characteristics of the various materials used with regard to the bending and forming process
16. 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 sharp, undamaged, plugs and cables secure and free from damage, machine guards or safety devices operating correctly)
17. 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
18. the problems that can occur with cutting, shaping and forming operations and how these can be avoided
19. the importance of using the machine guards and safety protection equipment at all times
20. inspection techniques that can be applied to check that shape and dimensional accuracy are to specification and within acceptable limits
21. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve

Scope/range related to performance criteria

1.

Ensure that the tools and equipment to be used are appropriate to the application and are in a safe and usable condition, by carrying out all of the following checks:

1.1 obtain all the necessary information to carry out the cutting, shaping and forming activities (such as drawings, specifications)
1.2 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
1.3 check that the hand tools are in a usable condition (such as hammer shafts secure; stakes, formers and striking faces free from defects and damage)
1.4 check that forming tools are appropriate and are in a serviceable condition (such as secure, correct shape, free from damage)
1.5 select appropriate machines for the cutting, shaping and forming operations being performed
1.6 ensure that machine guards and safety devices are in position and function correctly
1.7 ensure that machine settings are suitable for the material thickness and operations to be performed
1.8 use safe and approved cutting and shaping techniques at all times

2.

Cut and finish material to the marked out shape, using eight of the following:

2.1 tin snips
2.2 hand power tools (such as drill, nibbling, saw)
2.3 band saw
2.4 bench shears
2.5 punch/cropping machine
2.6 guillotine
2.7 trepanning
2.8 pillar drill
2.9 hacksaw
2.10 nibbling machine
2.11 bench saw
2.12 files

3.

Use three of the following types of forming equipment/techniques:

3.1 hammers/panel beating equipment
3.2 wheeling machine
3.3 stakes and formers
3.4 jenny/wiring machine
3.5 bending machine (hand or powered)
3.6 swaging machine
3.7 rolling machine (hand or powered)
3.8 spot heating techniques

4.

Perform cutting and shaping operations to produce four of the following shapes:

- 4.1 straight cuts
- 4.2 notches
- 4.3 internal curved contours
- 4.4 square holes
- 4.5 cut-ins (straight and curved)
- 4.6 round holes
- 4.7 external curved contours

5.

Carry out forming operations which produce five of the following shapes:

- 5.1 bends/upstands
- 5.2 curved panels
- 5.3 lobsterback trunking
- 5.4 folds
- 5.5 cylindrical sections
- 5.6 concertina ducting or trunking
- 5.7 box sections
- 5.8 cowlings and rounded covers
- 5.9 ribbed components
- 5.10 wired edges
- 5.11 square to round trunking
- 5.12 swages
- 5.13 other specific forming operations

6.

Produce components from two different materials from the following:

- 6.1 mild steel
- 6.2 brass
- 6.3 coated mild steel (such as primed, tinned, galvanised)
- 6.4 copper
- 6.5 stainless steel
- 6.6 lead
- 6.7 aluminium
- 6.8 titanium/special steels

7.

Cut, shape and form sheet metal components for three of the following marine outfitting applications:

- 7.1 frames
- 7.2 panels
- 7.3 kit lockers
- 7.4 tanks/reservoirs
- 7.5 sectional trunking
- 7.6 bunk spaces
- 7.7 vent ducting/trunking
- 7.8 toilet (head)/cubicles
- 7.9 pyrotechnic lockers

7.10 guards
7.11 shower cubicles
7.12 protective covers/cladding
7.13 hoods
7.14 galley equipment
7.15 stowage racks
7.16 stores
7.17 other specific components

8.

Produce marine sheet metal outfitting components which meet all of the following:

8.1 dimensional accuracy is within specification tolerances
8.2 finished components meet the required shape/geometry (to the template profile)
8.3 completed components are free from excessive tooling marks, deformation or cracking
8.4 meet the drawing or specification requirements
8.5 meet company and customer requirements

9.

Complete the relevant documentation in line with organisational procedures, to include one of the following and pass it to the appropriate people:

9.1 installation record
9.2 acceptance documentation
9.3 work authorisation documents
9.4 job cards
9.5 time sheets
9.6 craft/vessel log
9.7 other specific recording method

Behaviours

Behaviours:

You will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as:

- strong work ethic
- positive attitude
- team player
- dependability
- responsibility
- honesty
- integrity
- motivation
- commitment

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