

Marking out components for fabrication

Overview

This standard identifies the competencies you need for marking out sheet and plate work, rolled sections, and pipes/tubes using templates and basic tools, in accordance with approved procedures. You will be required to select the required materials to use and the appropriate marking out tools and equipment, based on the information presented to you and the accuracy to be achieved. Marking out will be the preparation required for cutting and shaping sheet materials, plate and sections, as appropriate to the application, and will include marking out workpiece datums, centre lines and cutting details, including hole centring and outlining details.

Items to be marked out may include ferrous and non-ferrous materials. Certain materials will require you to take the materials grain flow into account to avoid later production process problems.

Your responsibilities will require you to comply with organisational policy and procedures for the marking out activities undertaken, and to report any problems with the materials, equipment or marking out activities that you cannot resolve yourself, 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 own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will be sufficient to provide a good understanding of your work, and will provide an informed approach to applying marking out procedures. You will have an understanding of the marking out process, and its application, and will know about the materials as well as the care and use of the tools used, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety procedures required when using marking mediums, and when carrying out the marking out activities. You will be required to demonstrate safe working practices throughout, and will understand the responsibilities you owe to yourself and others in the workplace.

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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. obtain and use the correct information for marking out
3. obtain the appropriate marking out equipment and check that it is in a usable condition
4. prepare suitable datums and marking out surfaces
5. mark out using appropriate methods
6. check that the marking out complies with the specification
7. deal promptly and effectively with problems within your control and report those that cannot be resolved

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Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken when working in a fabrication environment with sheet, plate or rolled section materials (general workshop and site safety, appropriate personal protective equipment, accident procedure; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials)
2. the personal protective clothing and equipment (PPE) to be worn when carrying out the fabrication activities (such as leather gloves, eye/ear protection, safety helmets)
3. the correct methods of moving or lifting sheet, plate and rolled-section materials
4. the hazards associated with marking out fabricated components (such as working in a fabrication environment, lifting and handling sheet/fabricated components, slivers/burrs on sheet materials, using marking out mediums, working with laser marking out equipment), and how they can be minimised
5. the procedures to be adopted to obtain the necessary drawings and job instructions
6. 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)
7. the preparations that need to be carried out on the material, prior to marking out, to enhance clarity and accuracy, and safety
8. principles of marking out, developing basic shapes (flat, rectangular and cylindrical) from flat sheet, plate or rolled section materials
9. the effective use and care of tools/instruments
10. use of marking out conventions, datum edges/lines and centre lines
11. ways of laying out the shapes/patterns to maximise the use of plate or sheet material
12. the use of setting and adjusting tools (such as squares and protractors)
13. methods of marking out large or long shapes (such as chalk lines or optical equipment)

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14. marking out and transferring information from templates
15. the importance of using tools only for the purpose intended; the care that is required when using the equipment and tools; the proper way of preserving and storing tools and equipment between operations
16. the need for clear and dimensional accuracy in marking out to specifications/drawings
17. the problems that can occur in marking out fabrication components, and how these can be avoided
18. the extent of your own authority and whom you should report to if you have problems that you cannot resolve
19. reporting lines and procedures, line supervision and technical experts

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**Scope/range related
to performance
criteria**

1. Mark out sheet, plate or section materials on two from the following:
 1. hot-rolled mild steel
 2. aluminium
 3. non-metallic materials
 4. cold-rolled mild steel
 5. brass
 6. coated mild steel (primed, tinned or galvanised)
 7. copper
 8. stainless steel
 9. other specific material

2. Mark out sheet or plate for three of the following forms/shapes of component:
 1. bar and section lengths
 2. pipe/tube sections
 3. cutting detail for flat covers and plates
 4. structural support pads, bed plates
 5. frames or structures
 6. columns, beams or struts
 7. fish plates, gussets
 8. simple seatings (such as boiler saddles, tank cradles)
 9. spars and brackets

3. Mark out directly onto sheet or plate from drawings, using four of the following tools and instruments:
 1. scribe
 2. dividers or trammels
 3. centre punch
 4. chalk, bluing or paint
 5. rule and tape
 6. templates
 7. straight edge
 8. square
 9. etching
 10. laser
 11. other specific method

4. Mark out material to include three of the following features:
 1. datum and centre lines

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2. curved profiles
 3. square/rectangular profiles
 4. cutting detail
 5. circles
 6. hole centring and outlining (circular and linear)
5. Produce marked out component which meet all of the following quality and accuracy standards:
1. company/customer standards and codes of practise
 2. dimensionally accurate (to drawing or specification)
 3. uses recognised marking out conventions
 4. clearly defined for required processes

Behaviours

Additional Information

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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Developed by	Semta
Version Number	3
Date Approved	March 2017
Indicative Review Date	April 2020
Validity	Current
Status	Original
Originating Organisation	Semta
Original URN	SEMFWE221
Relevant Occupations	Engineering; Engineering and manufacturing technologies; Metal Forming, Welding and Related Trades
Suite	Fabrication and welding suite 2
Keywords	engineering; welding; fabrication; marking out; sheet materials; plate; section materials; equipment; methods
