SEMFWE2-21 - SQA Unit Code H2BE 04
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:

P1 work safely at all times, complying with health and safety and other relevant regulations and guidelines
P2 obtain and use the correct information for marking out
P3 obtain the appropriate marking out equipment and check that it is in a usable condition
P4 prepare suitable datums and marking out surfaces
P5 mark out using appropriate methods
P6 check that the marking out complies with the specification
P7 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:

K1 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)

K2 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)

K3 the correct methods of moving or lifting sheet, plate and rolled-section materials

K4 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

K5 the procedures to be adopted to obtain the necessary drawings and job instructions

K6 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)

K7 the preparations that need to be carried out on the material, prior to marking out, to enhance clarity and accuracy, and safety

K8 principles of marking out, developing basic shapes (flat, rectangular and cylindrical) from flat sheet, plate or rolled section materials

K9 the effective use and care of tools/instruments

K10 use of marking out conventions, datum edges/lines and centre lines

K11 ways of laying out the shapes/patterns to maximise the use of plate or sheet material

K12 the use of setting and adjusting tools, such as squares and protractors

K13 methods of marking out large or long shapes

K14 marking out and transferring information from templates

K15 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

K16 the need for clear and dimensional accuracy in marking out to specifications/drawings

K17 the problems that can occur in marking out fabrication components, and how these can be avoided

K18 the extent of your own authority and whom you should report to if you

	have problems that you cannot resolve
K19	reporting lines and procedures, line supervision and technical experts

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Additional Information

Scope/range related to performance criteria

You must be able to:

1. mark out sheet, plate or section materials on **two** appropriate materials from the following:
   - 1.1 hot-rolled mild steel
   - 1.2 aluminium
   - 1.3 non-metallic materials
   - 1.4 cold-rolled mild steel
   - 1.5 brass
   - 1.6 coated mild steel (primed, tinned or galvanised)
   - 1.7 copper
   - 1.8 stainless steel
2. mark out sheet or plate for **three** of the following forms/shapes of component:
   - 2.1 bar and section lengths
   - 2.2 pipe/tube sections
   - 2.3 cutting detail for flat covers and plates
   - 2.4 structural support pads, bed plates
   - 2.5 frames or structures
   - 2.6 columns, beams or struts
   - 2.7 fish plates, gussets
   - 2.8 simple seatings (e.g., boiler saddles, tank cradles)
   - 2.9 spars and brackets
3. mark out directly onto sheet or plate from drawings, using **four** of the following tools and instruments:
   - 3.1 scriber
   - 3.2 dividers or trammels
   - 3.3 centre punch
   - 3.4 chalk, bluing or paint
   - 3.5 rule and tape
   - 3.6 templates
   - 3.7 straight edge
   - 3.8 square
   - 3.9 etching
   - 3.10 laser
4. mark out material to include **three** of the following features:
   - 4.1 datum and centre lines
   - 4.2 curved profiles
   - 4.3 square/rectangular profiles
   - 4.4 cutting detail
   - 4.5 circles

4.6 hole centring and outlining (circular and linear)

5. produce marked out component which meet **all** of the following quality and accuracy standards:
   - 5.1 dimensionally accurate (to drawing or specification)
   - 5.2 uses recognised marking out conventions
   - 5.3 clearly defined for required processes

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