
Overview

This standard identifies the competencies you need to produce sheetmetal (up to and including 3mm) assemblies in accordance with approved procedures. You will be required to correctly interpret specifications and drawings, bring together and assemble and join, in the right order, sheetmetal components and/or light sections in order to construct completed fabricated assemblies or sub-assemblies such as ducting, tanks, cylindrical sections, conical sections, reduction pieces. You will be required to lay out and secure the various component parts of the structure using mechanical fastenings, resistance welding or self securing methods in the correct order and ensure they are assembled in a manner that is fit for purpose.

Your responsibilities will require you to comply with organisational policy and procedures for the sheetmetal fabrication activities to be undertaken and to report any problems with the activities, tools and equipment or materials 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 carry out.

Your underpinning knowledge will provide a good understanding of your work, and provide an informed approach to applying sheetmetal fabrication techniques and their assembly and fixing procedures. You will understand the techniques used and the requirements of the manufacturing and assembling procedures and their application. You will know about the methods of assembling the components of the required strength, that are fit for purpose in adequate depth to provide a sound basis for carrying out the activities, correcting faults and ensuring the work output is produced to the required specification. You will understand the safety precautions required when working with sheetmetal components 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.

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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 follow the relevant instructions, assembly drawings and any other specifications
 - P3 ensure that the specified components are available and that they are in a usable condition
 - P4 use the appropriate methods and techniques to assemble the components in their correct positions
 - P5 secure the components using the specified connectors and securing devices
 - P6 check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification
 - P7 deal promptly and effectively with problems within your control and report those that cannot be solved

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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 producing sheetmetal assemblies (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 protection, safety helmets, ear protection)
- K3 safe working practices and procedures needed for producing sheetmetal assemblies
- K4 the correct methods of moving or lifting bulky fabrications
- K5 the hazards associated with sheetmetal fabrication and assembly work and how they can be minimised (such using dangerous or badly maintained tools and equipment, lifting and handling long and heavy components, cuts, slips trips and falls)
- K6 how to obtain the necessary drawings and joining 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; cutting lines, centre lines, etc
- K10 the preparations that need to be carried out on the components prior to assembling them
- K11 the various methods of securing the assembled components the range of mechanical fastening devices that are used (such as nuts and bolts, screws, special fasteners, resistance and tack welding methods and techniques, adhesive bonding of components and self secured joints such as knocked up, paned down, swaged and joggled)
- K12 how to set up and align the various components and the tools and equipment that is used
- K13 methods of temporarily holding the joints together to aid the assembly activities (clamps, rivet clamps)
- K14 the use and care of tools and equipment, and control procedures
- 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 problems that can occur when producing sheetmetal assemblies, and how these can be avoided

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- K17 inspection techniques that can be applied to check shape (including straightness) and dimensional accuracy are to specification and within acceptable limits
- K18 the extent of your own responsibility 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. carry out **all** of the following during the sheetmetal assembly operations:
 - 1.1 correctly prepare and set-up the components and faces to be joined
 - 1.2 use the correct datum faces
 - 1.3 use the specified or appropriate fixing method
 - 1.4 correctly align the components and faces to be joined
 - 1.5 assemble/fabricate the sheetmetal components in the correct order or manner
 - 1.6 produce an assembly which meets the required specification
 2. produce **five** of the following sheetmetal assemblies:
 - 2.1 frames
 - 2.2 panels
 - 2.3 reduction pieces
 - 2.4 tanks
 - 2.5 sectional trunking
 - 2.6 transformers
 - 2.7 ducting
 - 2.8 square, rectangular and box sections
 - 2.9 segmented bends
 - 2.10 guards
 - 2.11 cylindrical sections
 - 2.12 conical sections
 - 2.13 hoods
 - 2.14 steel and composite material assemblies
 3. use **four** of the following types of components in the assemblies produced:
 - 3.1 sheetmetal covers
 - 3.2 flanges
 - 3.3 pre-fabricated square/rectangular components
 - 3.4 pipes
 - 3.5 pre-fabricated cylindrical/conical components
 - 3.6 light rolled section (angle, channel or tee section) stiffeners and frame components
 - 3.7 brackets
 4. assemble sheetmetal components using **two** of the following methods:
 - 4.1 temporary tack welding
 - 4.2 adhesive bonding
 - 4.3 soldering or brazing

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- 4.4 flanged and mechanically fastened (bolts, screws)
- 4.5 resistance spot welding
- 4.6 self securing joints (knocked up, paned down, swaged, joggled)
- 4.7 riveting (hollow or solid)
- 5. produce sheetmetal assemblies which meet **all** of the following quality and accuracy standards:
 - 5.1 all components are correctly assembled and aligned in accordance with the specification
 - 5.2 overall dimensions are within specification tolerances
 - 5.3 assemblies meet appropriate geometric tolerances (square, straight, angles free from twists)
 - 5.4 where appropriate pitch of erection holes meet specification requirements
 - 5.5 completed assemblies have secure and firm joints, are clean and free from burrs or flash

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