Overview

This standard identifies the competencies you need to produce basic sheet metal (up to and including 3mm) assemblies, in accordance with approved procedures. You will be required to work in accordance with instructions, to bring together, prepare for joining and assemble, in the right order, sheet metal components and/or light sections, in order to construct complete fabricated assemblies or sub-assemblies, such as ducting, tanks, cylindrical sections, etc. You will be required to lay out and secure the various component parts of the structure using mechanical fastenings, clamps or jigs, ready for welding or to use self-securing methods, in the correct order, and you will 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 sheet metal 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 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 sheet metal fabrication techniques and their assembly and fixing procedures. You will have an understanding of the requirements of the manufacturing and assembling procedures, the techniques used and their application. You will know about the methods of assembling components of the required strength, that are fit for purpose, in adequate depth to provide a sound basis for carrying out the activities to ensure the work output is produced to the required specification.

You will understand the safety precautions required when working with sheet metal 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.
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
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 sheet metal assemblies (general workshop and site safety, appropriate personal protective equipment (PPE), 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 that needs to be worn when carrying out the fabrication activities (such as leather gloves, eye protection, safety helmets, ear protection)

K3 the safe working practices and procedures to be used when producing sheet metal assemblies

K4 the correct methods of moving or lifting bulky fabrications

K5 the hazards associated with sheet metal fabrication and assembly work (such as using dangerous or badly maintained tools and equipment, lifting and handling long and heavy components, cuts, slips trips and falls), and how they can be minimised

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 marking out conventions (such as cutting lines, centre lines)

K9 the preparations that need to be carried out on the components prior to assembling them

K10 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)

K11 how to set up and align the various components, and the tools and equipment to be used

K12 methods of temporarily holding the joints together to aid the assembly activities (clamps, rivet clamps)

K13 the use and care of tools and equipment, and their control procedures

K14 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

K15 the problems that can occur when producing sheet metal assemblies, and how these can be avoided

K16 inspection techniques that can be applied to check that shape (including straightness) and dimensional accuracy are to specification and within acceptable limits
K17 the extent of your own authority and whom you should report to if you have problems that you cannot resolve
K18 reporting lines and procedures, line supervision and technical experts
You must be able to:

1. carry out all of the following during the sheet metal 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 sheet metal components in the correct order or manner
   1.6 produce an assembly which meets the required specification

2. produce four of the following sheet metal assemblies:
   2.1 frames
   2.2 sectional trunking
   2.3 tanks
   2.4 square, rectangular and box sections
   2.5 ducting
   2.6 cylindrical sections
   2.7 guards
   2.8 conical sections
   2.9 hoods
   2.10 reduction pieces
   2.11 panels

3. use three of the following types of components in the assemblies produced:
   3.1 sheet metal 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)
   3.7 brackets
   3.8 stiffeners and frame components

4. assemble sheet metal components using two of the following methods:
   4.1 temporary tack welding
   4.2 riveting (hollow or solid)
   4.3 soldering or brazing
   4.4 adhesive bonding
   4.5 resistance spot welding
   4.6 flanged and mechanically fastened (bolts, screws)
5. produce sheet metal 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, pitches of erection holes meet specification requirements
   5.5 completed assemblies have secure and firm joints, and are clean and free from burrs or flash
Producing sheet metal assemblies

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