Overview

This standard identifies the competences you need to carry out assembly operations to produce jigs or fixtures, such as drill jigs, machining fixtures, assembly fixtures, fabrication/welding jigs and fixtures, in accordance with approved procedures. You will be required to prepare the work area, and ensure that it is safe and free from hazards. You will also be required to check that specified components are available and fit for purpose, to obtain all relevant and current documentation, to obtain the tools and equipment required for the assembly operations, and to check that they are in a safe and usable condition. In carrying out the assembly operations, you will be required to follow company procedures and specified assembly techniques, in order to assemble the jig or fixture.

The assembly activities will also include making all necessary checks and adjustments, to ensure that components are correctly orientated, positioned and aligned, that moving parts have the correct working clearances, that all fasteners are tightened to the correct torque, and that the assembled parts are checked for completeness and function as per the specification.

Your responsibilities will require you to comply with organisational policy and procedures for the assembly activities undertaken, and to report any problems with the assembly activities, materials or equipment that you cannot personally resolve, or are outside your permitted authority, to the relevant people. 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 demonstrate a good understanding of your work, and will provide an informed approach to applying the appropriate assembly techniques and procedures for jigs and fixtures. You will understand the purpose of the jig or fixture being assembled, and its function, and you will know about the associated equipment, relevant components and joining techniques, 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 carrying out the assembly activities. 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 the relevant instructions, assembly drawings and any other specifications
3. ensure that the specified components are available and that they are in a usable condition
4. use the appropriate methods and techniques to assemble the components in their correct positions
5. secure the components using the specified connectors and securing devices
6. check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification
7. 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:

1. the specific safety precautions to be taken whilst carrying out jig and fixture assembly (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
2. the health and safety requirements of the work area in which you are carrying out the assembly activities, and the responsibility these requirements place on you
3. COSHH regulations with regard to the substances used in the jig and fixture assembly process
4. the hazards associated with producing jig and fixture assemblies, and how they can be minimised
5. the personal protective equipment and clothing (PPE) to be worn during the assembly activities
6. how to use and extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS or ISO standards) in relation to work undertaken
7. how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
8. the general principles of jig and fixture assembly, and the purpose and function of the components and materials used (including component identification systems, such as codes and component orientation indicators)
9. preparations to be undertaken on the components prior to fitting them into the assembly
10. the assembly/joining methods, techniques and procedures to be used, and the importance of adhering to these
11. how the components are to be aligned, adjusted and positioned prior to securing, and the tools and equipment that are used for this
12. the importance of using the specified components and joining devices for the assembly, and why you must not use substitutes
13. where appropriate, the application of sealants and adhesives within the assembly activities, and the precautions that must be taken when working with them
14. the quality control procedures to be followed during the assembly operations
15. how to use and read measuring instruments used in the jig and fixture assembly activities
16. how to conduct any necessary checks to ensure the accuracy, position, security, function and completeness of the assembly
17. how to detect assembly defects (such as ineffective joining techniques, foreign objects, component damage), and what to do to rectify them
18. the methods and equipment used to transport, lift and handle components and assemblies
19. how to check that the tools and equipment to be used are correctly calibrated, and are in a safe and serviceable condition
20. the importance of ensuring that all tools are used correctly and within their permitted operating range
21. the importance of ensuring that all tools, equipment and components are accounted for and returned to their correct location on completion of the assembly activities
22. problems with the assembly operations, and the importance of informing appropriate people of non-conformances
23. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve
Assembling jigs and fixtures using mechanical methods

Scope/range related to performance criteria

1. Carry out **all** the following during the jig and fixture assembly activities:
   1. Use the correct issue of drawings, job instructions and procedures.
   2. Check the calibration dates of tools and measuring instruments to be used.
   3. Use lifting and slinging equipment in accordance with health and safety guidelines and procedures.
   4. Ensure that components used are free from foreign objects, dirt or other contamination.
   5. Use safe and approved techniques to assemble the components.
   6. Use relevant COSHH sheets and risk assessments.
   7. Dispose of waste items in a safe and environmentally acceptable manner.
   8. Leave the work area in a safe and tidy condition.

2. Assemble components to produce **one** of the following types of jig or fixture:
   1. Drill jigs.
   2. Fabrication/welding jigs or fixtures.
   3. Machining fixtures.
   4. Assembly jigs or fixtures.
   5. Other specific jigs or fixtures.

3. Use **eight** of the following methods and techniques to produce the jig or fixture assemblies:
   1. Assembling of components by expansion/contraction.
   2. Applying sealants/adhesives.
   3. Fitting (such as filing, scraping, lapping or polishing).
   4. Electrical bonding of components.
   5. Securing by using mechanical fasteners/threaded devices.
   6. Assembling of products by pressure.
   7. Setting working clearances.
   8. Drilling.
   11. Applying bolt locking methods.
   12. Shimming and packing.
   15. Torque setting.
   17. Fusion (non-critical joints).
   18. Riveting.
4. Assemble jig and fixtures, using **eight** of the following components, as appropriate to the jig or fixture assembly:

1. main structure (framework, support, casting, panel, base plate)
2. fabricated components
3. clamps/holding devices
4. locating devices
5. guides/stops
6. levers/linkages
7. component lifting/extraction/transfer devices
8. pre-machined components
9. cutter/tool guides and setting devices
10. component location devices
11. bearings
12. bushes
13. cams and followers
14. shafts and couplings
15. gaskets and seals
16. chains and/or belts
17. keys
18. gears
19. belts
20. pipework/hoses
21. sprockets
22. pulleys
23. springs
24. support legs
25. pneumatic components
26. electrical components
27. hinge assemblies
28. other specific components

5. Assemble the jig or fixture, using **four** of the following assembly aids and equipment:

1. workholding devices
2. lifting and moving equipment
3. specialised assembly tools/equipment
4. jigs and fixtures
5. shims and packing
6. rollers or wedges
7. supporting equipment
8. templates
9. profile models

6. Use appropriate equipment to carry out **eight** of the following quality checks:
   1. positional accuracy
   2. freedom of movement
   3. component security
   4. completeness
   5. dimensions
   6. orientation
   7. alignment
   8. function
   9. bearing end float
   10. operating/working clearances
   11. freedom from damage or foreign objects

7. Produce jig and fixture assemblies which comply with **one** of the following quality and accuracy standards:
   1. BS or ISO standards and procedures
   2. customer standards and requirements
   3. company standards and procedures
   4. specific system requirements
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