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## Overview

This standard identifies the competences you need to produce marine assemblies from composite components, in accordance with approved procedures. You will be required to use appropriate drawings, specifications and documentation to produce composite assemblies, using the correct techniques. You will produce a range of composite assemblies such as hulls, bulkheads, superstructure, wheel houses, cabins, masts, spars, fairings, air intakes, steering equipment, rudders, skegs, tanks, casings and coverings, davits and internal fitments such as berths, vanity units, consoles, seating and shower units, incorporating a range of features such as loose and close fit tolerances, permanent and non permanent fixing, shape location, staggered, return and overlap joints. You will also be required to select the appropriate or specified assembly and joining techniques and methods for the composite components to be assembled.

Your responsibilities will require you to comply with organisational policy and procedures for the assembly activities undertaken, and to report any problems with the activities, 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 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 provide a good understanding of your work, and will provide an informed approach to applying production techniques and procedures for marine composite assemblies. You will understand the composite assembly techniques used, and their application, in adequate depth to provide a sound basis for carrying out the activities, correcting faults, and ensuring that the finished composite assembly is to the required specification.

You will understand the safety precautions required when carrying out the composite assembly activities, and when using the 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, both ashore and/or afloat.

**Performance  
criteria**

*You must be able to:*

- P1 work safely at all times, complying with health and safety and other relevant regulations, directives 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 health and safety precautions to be taken and procedures to be used when working with composite materials, consumables, tools and equipment in the specific work area
- K2 the hazards associated with using marine composite materials, consumables, tools and equipment, and how to minimise these in the work area
- K3 protective equipment that is needed for personal protection (PPE) and where required, the protection of others
- K4 the application of COSHH regulations in relation to the storage, use and disposal of composite materials and consumables
- K5 the specific workshop environmental conditions that must be observed when producing marine composite assemblies (such as temperature, humidity, styrene levels to threshold limits, fume/dust extraction systems and equipment)
- K6 how to use and extract information from drawings and related specifications (to include symbols and conventions to appropriate BS or ISO standards) in relation to work undertaken
- K7 how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
- K8 quality procedures used in the workplace to ensure production control (in relation to currency, issue, meeting specification, etc.), and the completion of appropriate documents
- K9 conventions and terminology used for the marine composite assembly activities (such as types of components used, types of fittings and fasteners, materials and adhesives used)
- K10 preparations to be undertaken on the composite components prior to assembly
- K11 the assembly/joining methods, techniques and procedures to be used, and the importance of adhering to these procedures
- K12 how the components are to be aligned, adjusted, positioned and clamped prior to assembly, and the tools and equipment that is used
- K13 the importance of using the specified components and joining devices for the assembly, and why you must not use substitutes
- K14 where appropriate, the application of sealants and adhesives within the assembly activities, and the precautions that must be taken when working with them
- K15 the quality control procedures to be followed during the assembly operations
- K16 how to conduct any necessary checks to ensure the accuracy, position, security, completeness and (where appropriate) the function of the assembly

- K17 how to detect assembly defects (such as ineffective joining techniques, foreign objects, component damage), and what to do to rectify them
- K18 the methods and equipment used to transport, lift and handle composite components and assemblies
- K19 how to check that the tools and equipment to be used are in a safe and serviceable condition
- K20 the importance of ensuring that all tools are used correctly and within their permitted operating range
- K21 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
- K22 problems with the assembly operations, and the importance of informing appropriate people of non-conformances
- K23 the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve

**Scope/range  
related to  
performance  
criteria**

- You must be able to:*
1. Carry out **all** of the following during the composite assembly activities:
    - 1.1 use the correct issue of production documentation (such as drawings, manuals, specifications, job cards)
    - 1.2 use relevant health and safety documentation (such as material data sheets, COSHH sheets, risk assessments)
    - 1.3 use the correct tools and equipment for the activity, and ensure that they are safe to use and suitably stored
    - 1.4 keep the work area in a safe and tidy condition
  2. Carry out **all** of the following when preparing for the assembly activity:
    - 2.1 check that mouldings are correct and complete
    - 2.2 select the correct equipment for the activity
    - 2.3 check for any defects in the mouldings
    - 2.4 check that equipment is suitable for use
    - 2.5 check that components are correct and complete
    - 2.6 check for any defects in the components
    - 2.7 check the availability of ancillary materials required
    - 2.8 identify and protect the moulding and components in the work area
  3. Produce **two** of the following types of composite assembly:
    - 3.1 trial assemblies
    - 3.2 one-off assemblies
    - 3.3 batch assemblies
    - 3.4 assembly line
  4. Produce **four** of the following marine composite assemblies:
    - 4.1 hull
    - 4.2 masts/spars
    - 4.3 superstructure
    - 4.4 bulkhead
    - 4.5 casings/coverings
    - 4.6 rudder
    - 4.7 skegs
    - 4.8 air intakes/vents
    - 4.9 fairings
    - 4.10 davits
    - 4.11 cabins
    - 4.12 berths
    - 4.13 seating

- 4.14 tanks
  - 4.15 steering equipment
  - 4.16 wheel houses
  - 4.17 consoles
  - 4.18 shower units
  - 4.19 vanity units
  - 4.20 radar/navigational domes
5. Produce marine composite assemblies that incorporate **four** of the following features:
- 5.1 loose fit tolerances
  - 5.2 non-permanent fixing
  - 5.3 staggered joins
  - 5.4 close fit tolerances
  - 5.5 shape location
  - 5.6 permanent fixing
  - 5.7 return joins
  - 5.8 overlap joins
6. Produce composite assemblies, using **four** of the following methods and techniques:
- 6.1 fettling
  - 6.2 clamping
  - 6.3 aligning
  - 6.4 assembly sequences
  - 6.5 pinning
  - 6.6 trial fitting
  - 6.7 assembly jigs
  - 6.8 drilling
7. Produce composite assemblies, using **three** of the following joining methods:
- 7.1 thread inserts
  - 7.2 mechanical fasteners
  - 7.3 anchor nuts
  - 7.4 quick-release fasteners
  - 7.5 adhesive bonding
  - 7.6 laminating
  - 7.7 rivets
  - 7.8 pins
8. Produce a range of assemblies which comply with **one** of the following standards:
- 8.1 BS, ISO or BSEN standards and procedures

- 8.2 customer (contractual) standards and requirements
  - 8.3 company standards and procedures
  - 8.4 recognised compliance agency/body's standards
9. Complete the relevant paperwork, to include **one** from the following and pass it to the appropriate people:
- 9.1 build records
  - 9.2 quality/acceptance documentation
  - 9.3 system log
  - 9.4 job cards
  - 9.5 work authorisation documents
  - 9.6 other specific reporting method

## SEMME3146 - HY1E 04

### Producing marine composite assemblies

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